THE C.W. RAYMOND CO.

CLAY WORKING MACHINERY

DAYTON, OHIO. U.S.A.

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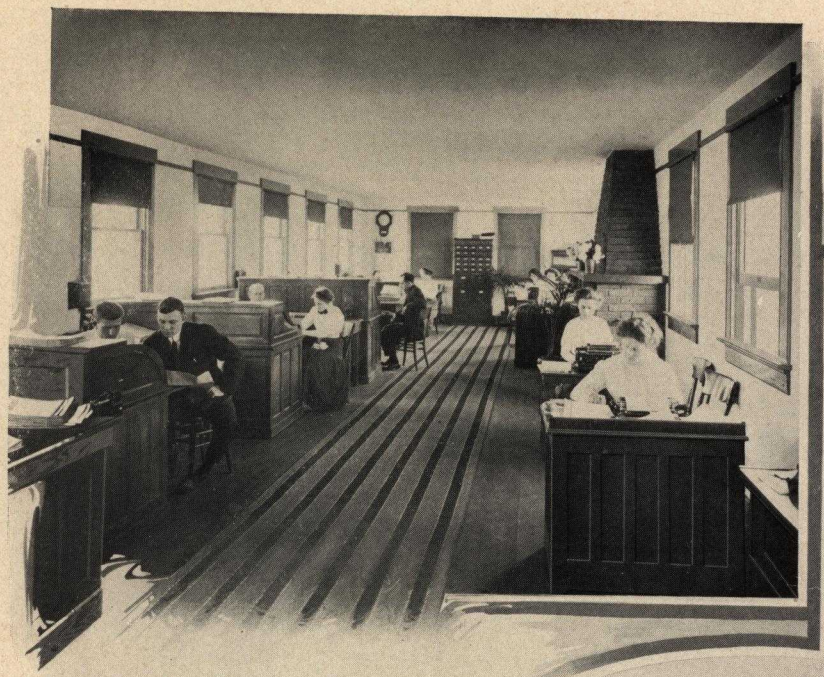
Clay Working Machinery

¶ An Encyclopedia of High Grade Machinery, Equipment, Dryers and Kilns for Brickmakers, Tile Manufacturers and Holloware Producers.

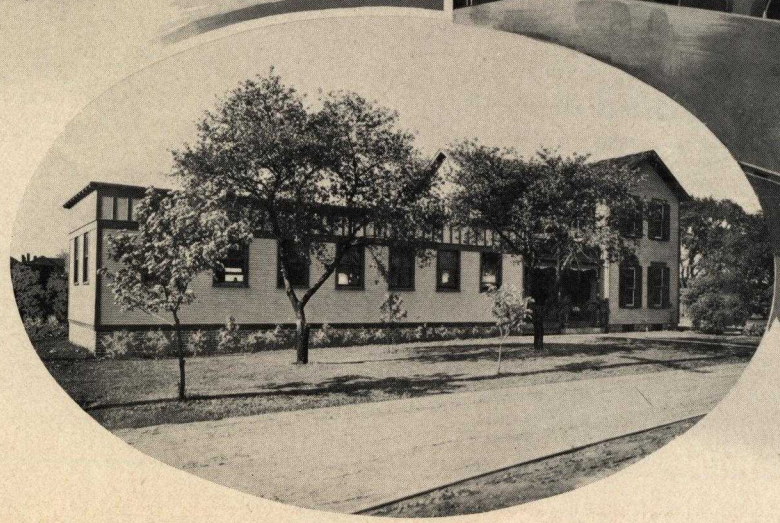
THE C. W. RAYMOND COMPANY

The Strongest Power in the World
of Clay Working Machinery

DAYTON, OHIO, U. S. A.



General Office



President's Office

Proclamation

Governed by an insatiable desire to produce only machinery that will carry the unqualified approval of the clay worker, we have associated with us engineers, mechanical chemical and ceramic, who are graduates of the great Universities of the World and it is a product of their untiring labors, practical experience and knowledge that we present for your consideration in the following pages.

The E. W. Raymond Co.,
Dayton, Ohio. U. S. A.

Patents.

The basic principles of our various machines, as well as movements and parts, our drying processes and kilns, are thoroughly covered by United States Letters Patent, and any infringement thereof will be vigorously prosecuted.

Guarantee.

Our entire line of Machinery is covered by broad guarantees which are known and respected in the entire Clay Working World. However, should we find it necessary, we at all times reserve the right to make any changes in the machinery illustrated herein, which in our opinion, is for the betterment, or to meet local conditions.

Clay Testing and Analyses.

OUR varied experience teaches us that the only feasible manner in which to learn the true value of a clay or shale for the manufacture of burnt clay ware, is by practical test, and that we may place this knowledge before a prospective purchaser, we have equipped an extensive clay testing laboratory, consisting of modern machines, dryers, kilns, etc., in connection with which, is a chemical laboratory whereby the practical tests can be auxiliarated by chemical analyses.

Our reports are true and conservative, and no knowledge is withheld which would tend to embarrass one after making the investment, nor do we in any manner "juggle" materials, producing beautiful samples, solely for the sake of securing your contract, as it is as much to our interest to have your plant a success and our machinery operating as it should, as it is to you in making the investment.

A nominal charge is at all times made, which covers only a portion of the cost.

In shipping clay, great care must be exercised to properly mark each package, both with our name and address and with yours, prepaying the transportation charges in all cases. These items are very important, inasmuch as we are continually receiving material for testing, and it is necessary for us to know from whom it came. Furthermore, we do not, under any circumstances, receive clay from the railroad companies on which all the charges have not been paid.

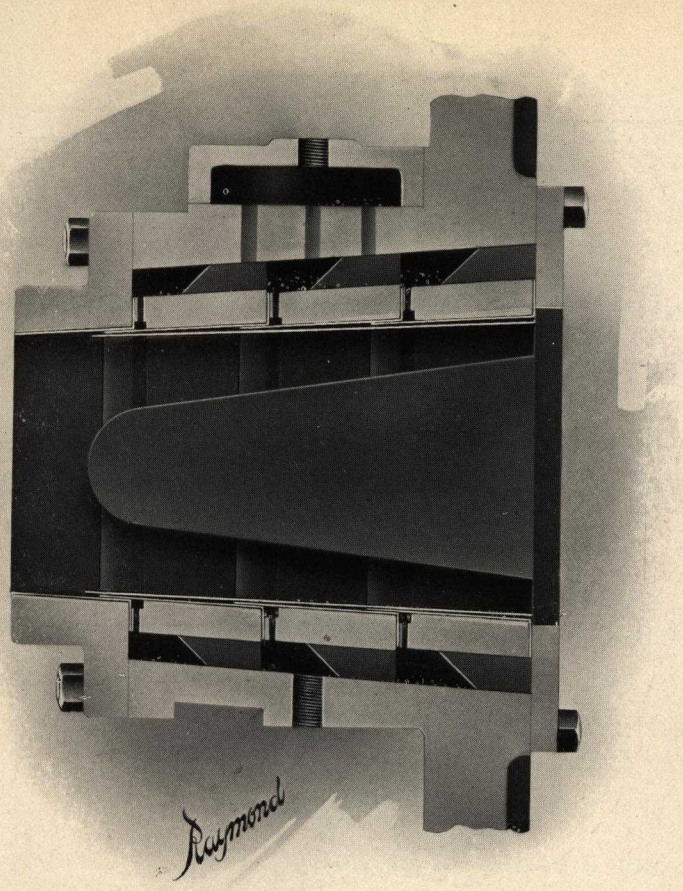
Brick Machine Dies.

IN MANIPULATING clays and shales, their individuality makes itself most most manifest in the formation of the column, consequently centering very intricate study in the die.

It is a well-known fact to all clay workers, that parts of a plastic bar of clay emerge from the die with different velocities. Owing to its plasticity, the center of the bar moves with a greater speed than the surfaces, and generally the corners have a less speed than the surface of the sides and ends. To alleviate this difficulty, a multiplicity of devices have been placed upon the market. However, the friction is reduced to the best advantage by judicious lubrication.

Dies of the advanced type are generally made hollow and steam or water fills the cavities surrounding the clay, with arrangements to control the lubrication to a nicety. The shape, length and taper per inch, as well as the kind of lubricant, must always be determined by the nature of the material, as no fixed laws can be found, governing the formation of plastic, tempered clays or shales into various wares.

In order to properly control the lubrication of the column, the most accepted device is known as the "lined die" which consists mainly of a hollow box or housing, containing a series of liners, made in sections, and the lubricant flows between them to the column. A difficulty encountered at this point, is due to the fact that the entrance of the lubricant from the outside source is at one point of the housing making the greatest pressure at the one place. To counteract this difficulty we have designed our liners with an off-set forming a diffusion chamber connected with the main chamber by a series of holes, which give perfect distribution and consequently even lubrication.



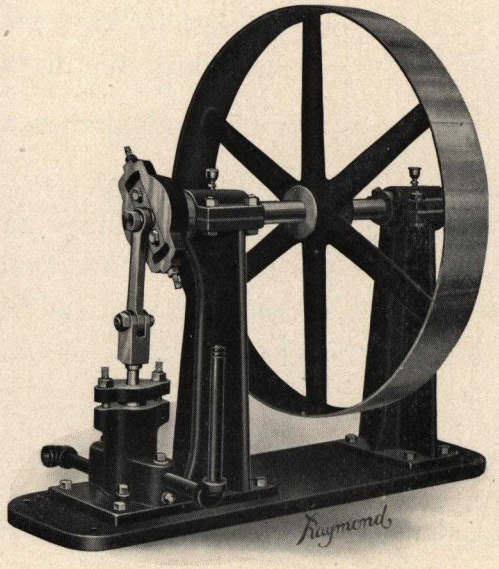
One Type of Raymond Lubricating Die.

Fat, plastic clays, will in many cases, run without trouble in a non-lubricated die, and occasionally clays are found which are better manipulated by a non-lubricating or dry die, than with the lubricated one.

The matter of temper of the clay enters very largely into the success of making a smooth column, and many times mixtures of different materials are required. The common difficulty of improper tempering is the cracking of the bar of clay at the corners. If the clay is too soft, the cracks point away from the die. Different clays show a very marked difference in flowing through the die, and herein enters one value of a practical test before investing in a clay bank and machinery for its manipulation.

Each style of die, while dependent entirely upon the characteristics of the material, is, in practice, somewhat defined in its use. Lubricating dies are used principally in the manufacture of common builders, pavers, fine face brick and fire brick, while the dry die is almost invariably found on machinery manufacturing sewer pipe, drainage tile and sometimes holloware and kindred products.

At times it has been found advisable to force lubrication onto the clay column and to that end we have designed a forced lubricating pump with adjustable stroke and pressure which has been found to alleviate difficulties in many materials and can be arranged to work in connection with any brick machine or lubricating die.



Lubricating Pump.

Stiff Plastic Brick Machinery.

UP TO the era of improvement beginning some years ago, the lesser details of construction in clay working machinery were considered of very little importance, and not much attention was given to them until machine manufacturers of this class were forced to give more and better care to these matters, the advent of the Raymond "777" Brick Machine being the lever by which a better grade and higher class of machinery was forced into being. Since then, we have invariably been the first ones to appreciate the value of new ideas, and when we give to the brick making public anything which is new and novel in its nature, they are satisfied that it is beyond the experimental stages and has been perfectly demonstrated.

Copies and imitations have been made since time began, and the old adage, that imitation is the sincerest flattery, has been proven to us time and time again. Within the past five years, six attempts have been made to imitate our No. 2 Automatic Cutting Table, all of which have met with dismal failure. These imitations have invariably required an absolute reversal of policy and arguments, as the intermittant motion had been so strongly exploited until our performance with the No. 2 Automatic proved a better principle.

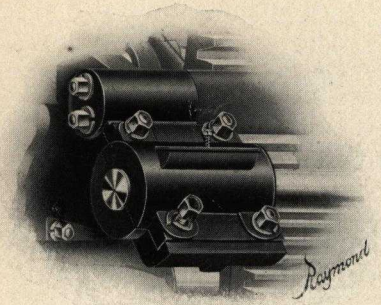
Inasmuch as some certain general descriptions will apply to all of our line of brick machines, we will avoid confusing repetition by briefly explaining several of the details which enter into the make-up of the entire machine.

FINISH:—While the matter of finish may not enter very deeply into the subject of stiff plastic brick machinery, because of the rough work it is compelled to do, we have some natural pride in seeing a machine leave our factory attractive to the eye, as well as possess the knowledge that it is perfect in construction. We use a good grade of steel paint, and cover all polished surfaces with lacquer to prevent rust while enroute.

THE POINTS OF CONTACT, or two surfaces of any castings which are joined together, are always and invariably machine fitted into place. This entails greater work and therefore a larger expense on our part, but its justification is the fact that the structure shows a rigidity far in excess of any less careful form of construction. This of necessity adds life to the machine as well as lends its part toward the manufacture of a better product.

SHAFTING:—The shafting used throughout our entire line of machinery divides itself into two kinds: that of cold rolled steel, and of forged or hammered steel. The importance of the shafting is readily discernible when it is realized that the entire power of the machine, including its overload, which at times is excessive, must be transmitted continuously through the shafting. All driving and intermediate shafts are made from the best grade of cold rolled steel that can be found on the market. Great care is taken to have it true, both as to straightness and size. The safety margin in all cases greatly exceeds any reasonable demands which can be made upon it.

The hammered steel shafting is used in such places as the main shafts of the Brick Machines and Pug Mills, the vertical shafts on the Dry Pans, etc. This allows us to forge collars on the shaft, and make it hexagonal or other form, which prevents the use of keys, feathers, loose collars and the like, all of which require cutting into the shaft, thereby weakening it.



Journal Bearing.

BEARINGS:—Experience has taught that there are certain proportions to journal bearings whereby the best results are obtained, and which meet the requirements of the work. Any decrease in these proportions will weaken the bearing, while an increase will give an increased friction load without additional efficiency.

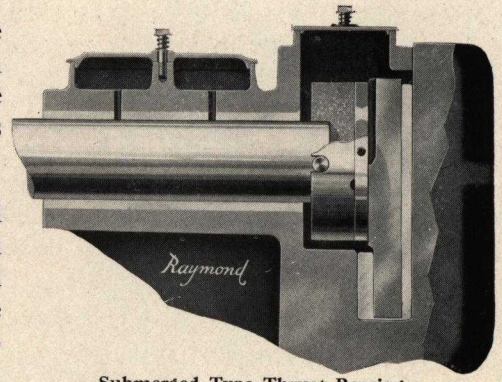
A point of considerable interest enters at this juncture, and that is the manner of fitting the caps to the journal boxes. These caps are machine fitted into seats, thus relieving any shearing strain on the bolts, therefore, allowing them to do their entire duty in holding the parts together. Our bolts are equipped with lock washers in preference to lock nuts. Time and experience has proven that there is danger of the lock nut coming loose, and thereby failing in its duty, whereas the lock washer is so constructed that it is impossible for it to release even under the most severe vibration.

This has been proven to the satisfaction of the great railroad systems such as the Pennsylvania Railroad, who use lock washers on their rail bolts, and we believe no one will gainsay the statement that the vibration of a railroad rail, while a heavy and fast train is passing over it, is as severe a trial as can be found in any place. Therefore, if the lock washer has proven its efficiency for such rigorous duty, it certainly cannot fail under such little vibration as comes from our brick machines.

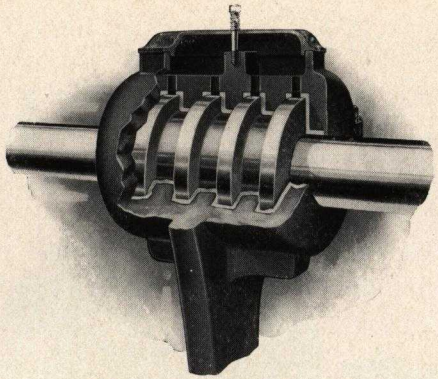
SUBMERGED TYPE THRUST BEARING:—It is a well-known law of physics, that pressure exerted in one direction must be resisted with an equal pressure in the opposite direction or motion will result. This principle applies directly to the Brick Machine.

The pressure of the auger in forcing out the clay bar must be met with equal or greater resistance in order to hold the auger and shaft in its place. This is better known as back pressure. To resist this back pressure, we have designed our submerged type thrust bearing. This consists of a steel plate revolving with the shaft, and a plate stationary with the machine, between the two being a phosphor bronze plate or disc which is at liberty to either turn with the shaft or remain stationary, as the friction on either side allows it to do. The bearing runs submerged in oil, and is therefore continuously lubricated. Grooves are provided whereby the oil can at all times find its way to the center.

The bronze plate is drilled with numerous holes through its thickness, and these holes are filled with babbitt and then machined to size. This construction presents several features of merit. In the first place, the bronze and babbitt metal are as near frictionless as metal can be made. In the second place, the bronze being hard, resists the wear, while the babbitt being of a softer nature, takes up any grit which may occur. Being submerged, it runs without heat.



Submerged Type Thrust Bearing.



Marine Type Thrust Bearing.

MARINE TYPE THRUST BEARING:—At times we are compelled to save space in the design of a machine, particularly in our Pug Mills and "888" Brick Machine. To do this, we use what is known as the Marine Thrust. This consists of a series of collars turned on the shaft, and running in corresponding grooves in the journal box. This can be lengthened along the shaft as may be necessary to meet all requirements, while at the same time it takes less diameter than the submerged type and presents a greater thrust surface in a given space.

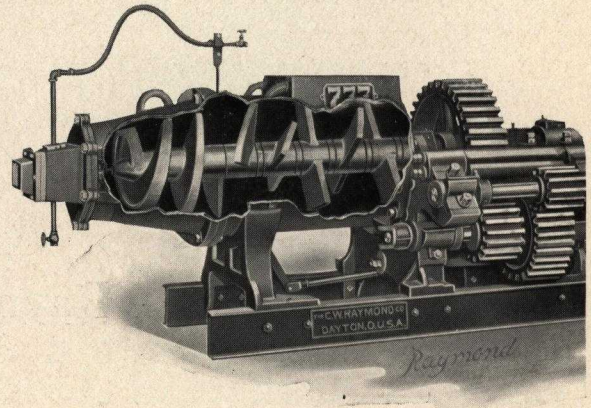
Its value is best described by its name, as it is the style of bearing used to counteract the enormous thrust of the propellers of our magnificent oceans greyhounds, which use thousands of horse power in pushing the enormous vessels through the water. We apply the same principle in a smaller way, and reservoirs are provided whereby constant lubrication prevents undue wear.

THE SAFETY SHEARING DEVICE:—A very important personage in the process of the manufacture of stiff plastic brick, is the man at the pug mill, as inattention, carelessness or lack of judgment on his part will produce many losses.

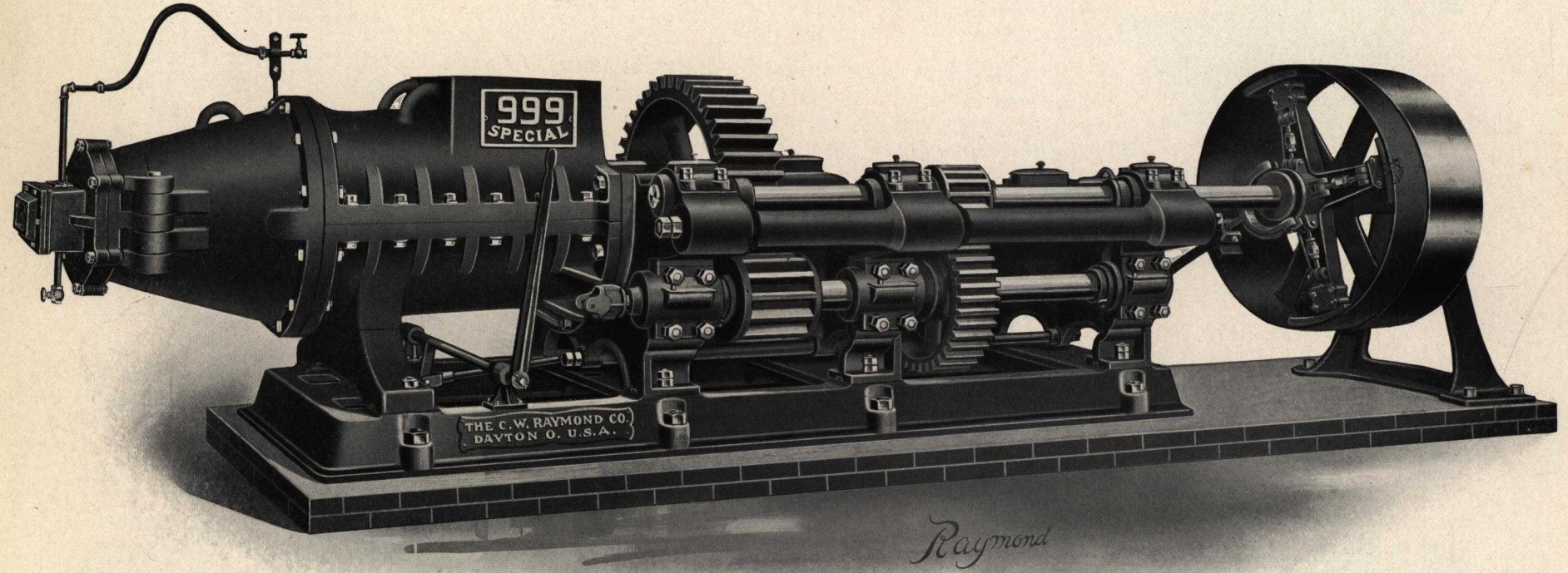
Should he allow too much water to get into the material, a bad column will be produced, the bricks have less density and be inclined to porosity. Should he allow the material to become too stiff and without sufficient water, the compression of the auger will become too great for the strength of the machine. To obviate this latter possibility, we use what is known as a safety shearing device so when the pressure becomes too great, it will release and allow the hinged front to swing open, thus relieving all strain from the machine.

The safety shearing device consists of a link held in position by a wrought iron bar of about 3/8 inches in diameter, which will shear off before the machine can break, in which case all that is necessary is to replace the pin with a new one, at an expense of only a fraction of a cent.

INTERIOR:—Owing to many great variations in material, local conditions, etc., we have no real standard of construction for the interior of a brick machine, for what might work perfectly in one material, will be an utter failure in another. The appearance, however is as illustrated, with four knives, auger wing and auger, all placed on the hexagonal shaft from the front end and held in position by a cap screw. The rings between the knives may be removed and the fifth knife placed upon the shaft. Any one of a dozen or so styles are used to meet the conditions.



Interior of Brick Machine.



The Raymond "999" Special Brick Machine.

The Raymond "999" Special Brick Machine.

THE DEMAND of the 20th Century for high capacities and stupendous machinery, as well as being more exacting in quality, has lead us to the construction of the "999" Special Brick Machine. No brick machine ever built can compare with it for massiveness and strength. It is beyond the plane of possibility, either by photograph or flowery description, to impress upon the most fertile imagination the faintest conception of the wondrous size of this machine. Great in everything that requires greatness, heavy where much weight is wanted, with twice the capacity of its nearest rival, its parts finished with the same care and precision as the most intricate details of a modern Corliss Engine, and designed along the lines of the most accepted mechanical construction.

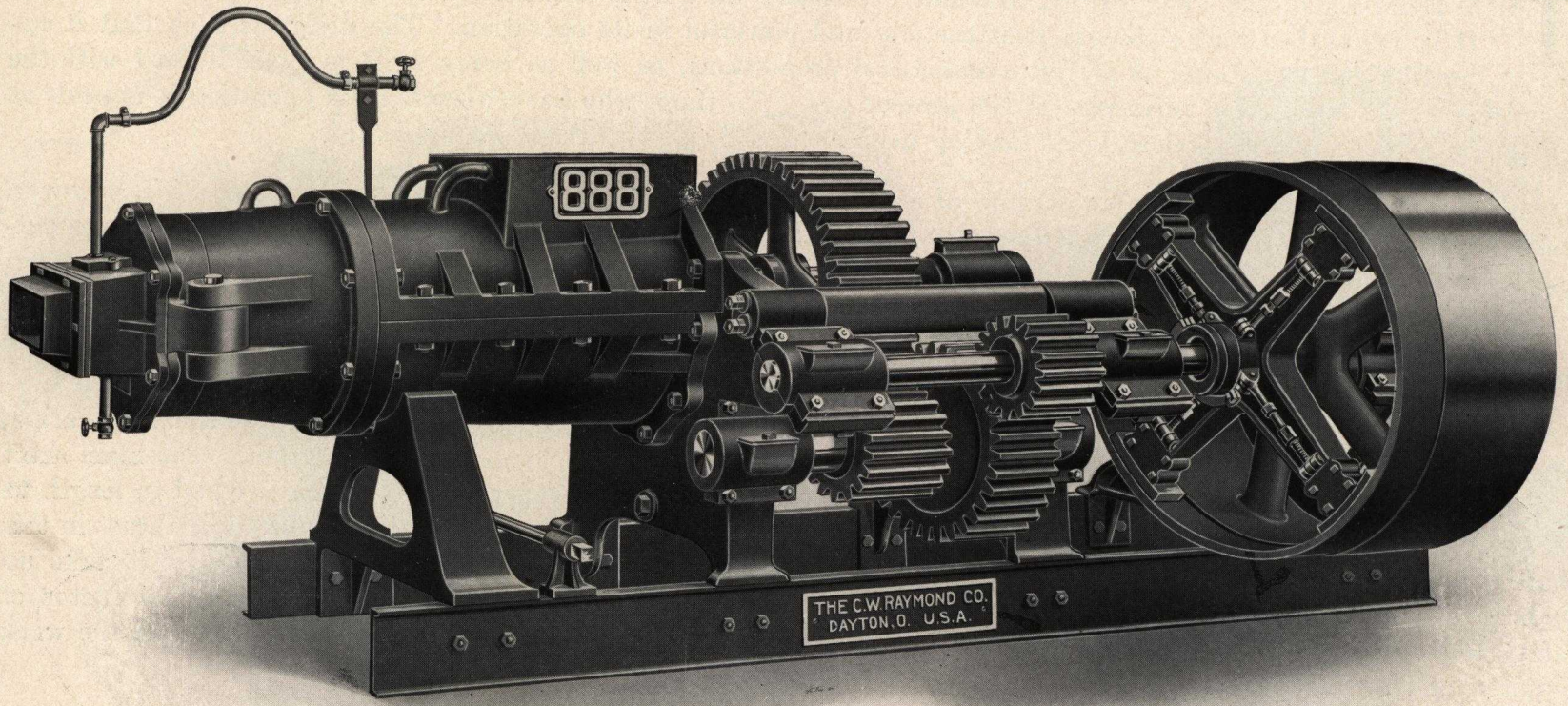
Built upon a sub-base of gray iron, which is designed on the principle of a hollow square, rendering it incapable of being twisted, sprung or vibrated under the most trying conditions. The pads upon which the legs rest are carefully finished and tongued to fit the corresponding grooves in the leg. The legs in their turn are carefully machined and are held firmly in position by heavy bolts, securely locked by spring washers. This base is arranged for eight foundation bolts, and is so designed so as to have a bearing entirely around the foundation.

One feature of great merit in the design and construction of the "999" Special is the fact that there are three longitudinal bearings on the hexagon hammered steel main shaft, and more, the rear portion of this shaft is twice the length of the suspended or auger bearing portion. This construction renders it vibrationless and it cannot deviate from its fixed position.

To take up the rear thrust of the main shaft, two thrust bearings are provided. The forward one being in the center bearing of the machine and is of the marine type, while the rear thrust is located in the box at the end of the main shaft, adjustable to the rear gear frame. This is of the submerged type. The enormous back pressure or thrust is consequently so evenly distributed that no amount of pressure can cause these bearings to unduly wear or heat and the possibility of trouble in that part of the machine is reduced to an absolute minimum.

All bearing caps are planed and machine fitted to their seats. The bolt holes are drilled and the bolts turned to fit. All shafts are of heavy steel and the gearing is so designed as to be able to transmit five times the horse power required to operate the machine.

This magnificent specimen of brick machinery construction is furnished with a 48 inch by 16 inch four arm type friction clutch pulley and should run 250 to 300 revolutions per minute. It is 19 feet 8 inches long over all, being 6 feet 9 inches wide and 5 feet 2 inches high. Its capacity is from 100,000 to 200,000 standard size building brick in ten hours of continuous operation. Approximate weight 25,000 pounds.



The Raymond "888" Brick Machine.

The Raymond "888" Brick Machine.

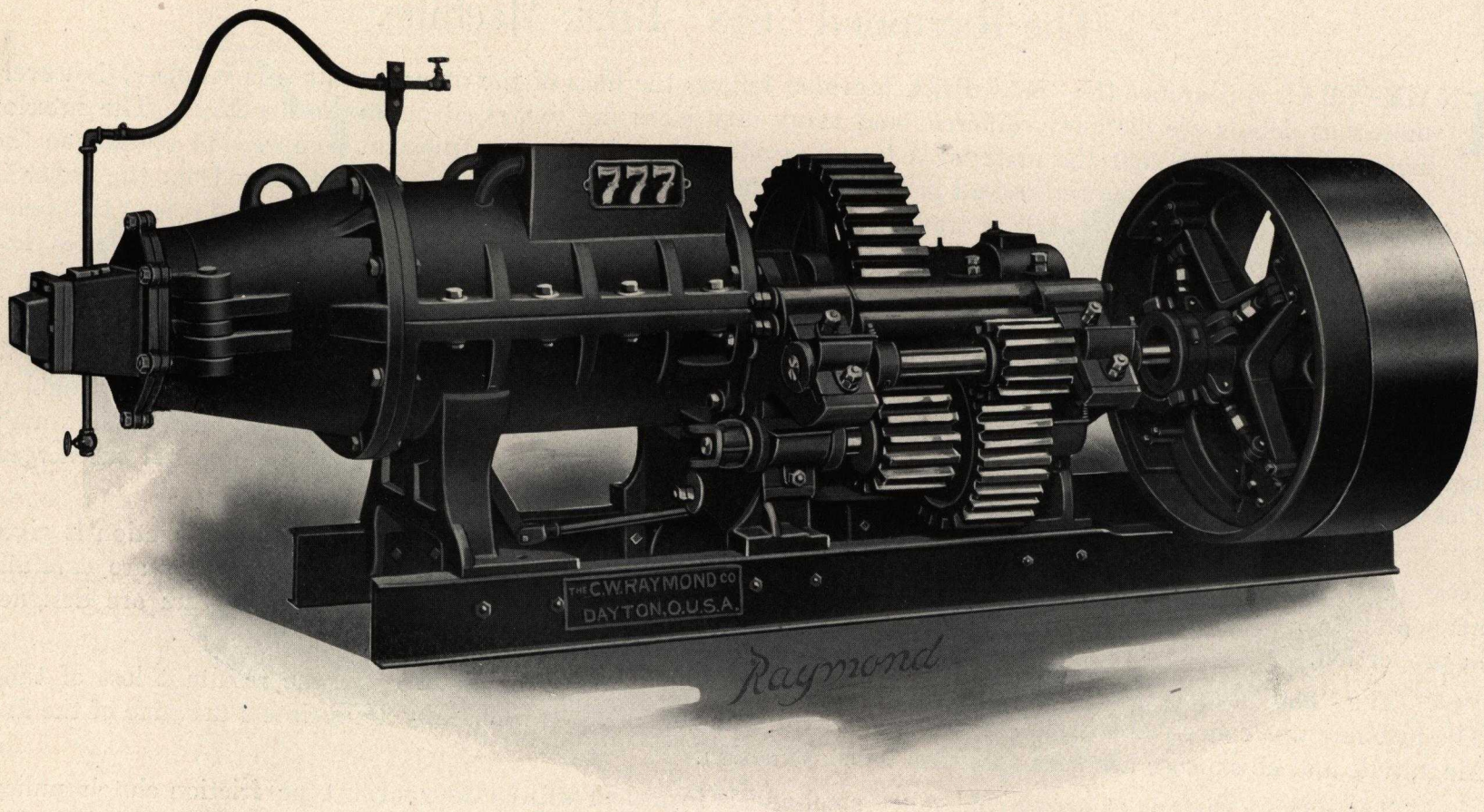
IN GENERAL appearance the "888" Brick Machine follows the lines of the other machines in its class, however, numerous details are distinctly different and many new ideas are expressed in its construction. The interior arrangement is such that the material is forced rapidly forward with but sufficient compression to exclude the air. The extension is convex instead of concave as heretofore, and the delivery of the clay from the auger is against this extension where the angle of travel is the greatest and against the surface on all sides and it is at this point in the extension, between the auger and the die, that the compression takes place. This construction requires less power for operation and the clay bar is gradually formed upon entering the die, with equal friction on all sides.

In the design of the rear end of the machine, we have combined the thrust bearing with the journal. To do this we place a sleeve on the end of the shaft, part of which is turned to form the thrust and the remaining portion is the journal. The thrust is of the marine type, which is also assisted by the application of the end of the sleeve against the gear frame, making a disc thrust. This sleeve is extended far enough forward to receive a packing gland, making the interior of the bearing dust tight and forming a reservoir for oil, making the thrust and journal submerged. This sleeve is renewable, and eliminates the wear on the shaft and is replacable at a slight expense.

Generally speaking this machine is much heavier than really seems necessary and exacting inspection is given every part. All important points of contact or the points at which the various parts come together are carefully machine fitted. The gearing is massive, the main gear being 10 inch face and the intermediate gears are designed in proportion.

The "888" can be run to its full limit of capacity without fear of breakdown and the resultant loss of time. The machine was conceived and designed to supply the demands of those who really appreciate a machine of the first Magnitude and no expense has been spared in its construction.

The driving shaft is of heavy cold rolled steel and is furnished with a four arm type friction clutch pulley, 48 inches in diameter by 14 inch face, which should run from 200 to 250 revolutions per minute. Its length is 13 feet 4 inches, width, 5 feet 11 inches, height 4 feet 4 inches. Its capacity is from 50,000 to 75,000 brick daily. Approximate weight 16,000 pounds.



The Raymond "777" Brick Machine.

The Raymond "777" Brick Machine.

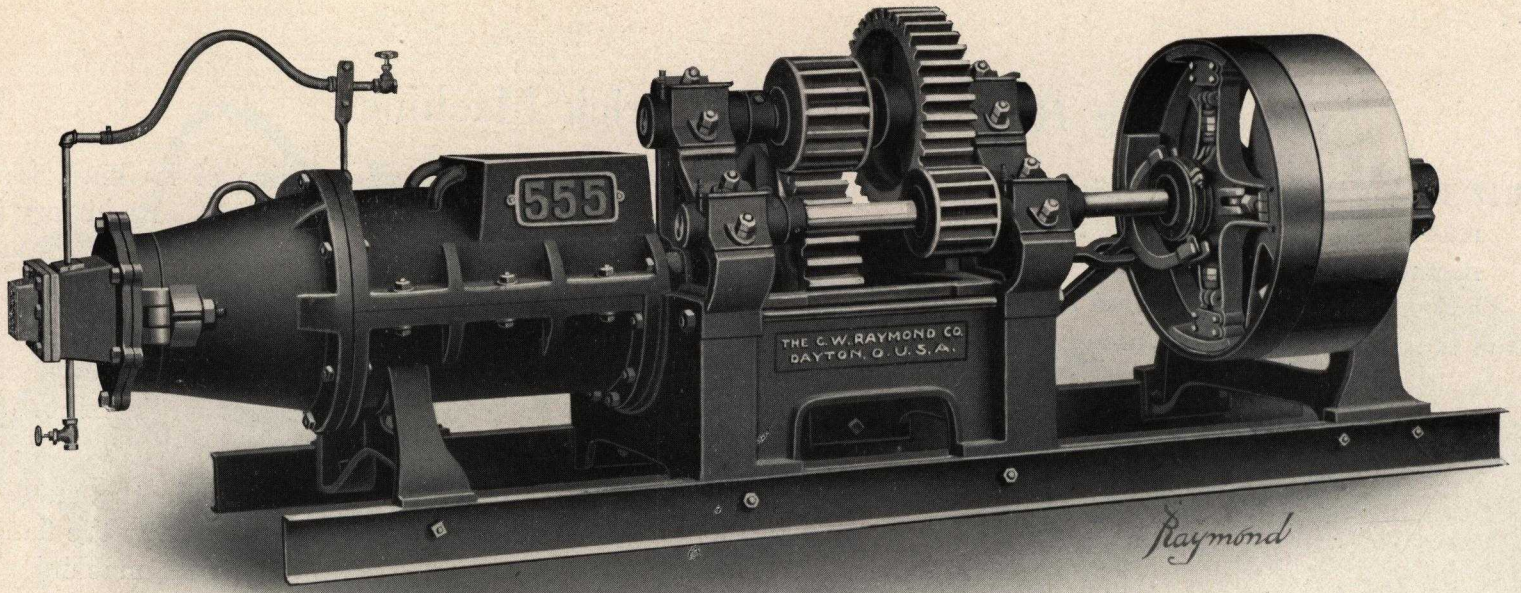
THE RAYMOND "777" Brick Machine has won the greatest popularity of any machine of its kind, for the reason that it will turn out more brick and better brick than any machine of equal rating. Its history from its first inception to the last one shipped has been a record of success with unvarying sameness. A machine whose performance has won for it the place of the standard by which all brick machines are built. The construction is upon the highest mechanical lines and has many exclusive advantages, mainly in detail.

One of the potent factors is the accessibility of all of its parts, which advantage is more thoroughly appreciated by the mechanic and the engineer, who know only too well of the waste of time and money spent on machines whose parts are difficult to reach.

The "777" is built upon a foundation of heavy steel channels, which are extended to include the out board bearing, making the machine self contained. The supporting legs of the brick machine not only rest on the flange of the channels but extend down the sides and are bolted through them. This construction renders the machine vibrationless under the most rigid service. The train of heavy gears is made with a view to longevity under rigorous and continuous duty. These gears have 2½ inch pitch, wide faces and are proportioned with a factor of safety of about three. The pinions are of solid steel.

The front of the machine is hinged and fitted with the safety shearing device, which is so designed as to prevent the breaking of the machine, should the material become too stiff. In case such a thing should occur the safety device will break, throwing the hinged door open, thereby relieving all strain on the machine. The machine can then be cleaned and more care exercised in the pugging of the material.

All of the shafting is of steel largely in excess of the work required of it and the main shaft, besides the two large longitudinal bearings, is fitted with an anti friction thrust bearing of the submerged type. It is furnished with a four arm type friction clutch pulley, 42 inches in diameter by 12 inch face and should run from 200 to 250 revolutions per minute. When erected for operation it occupies a floor space of 12 feet 4 inches long, 5 feet 11 inches wide and its height is 4 feet 2 inches. The capacity is from 40,000 to 60,000 standard size building brick per day of ten hours. Approximate weight 14,000 pounds.



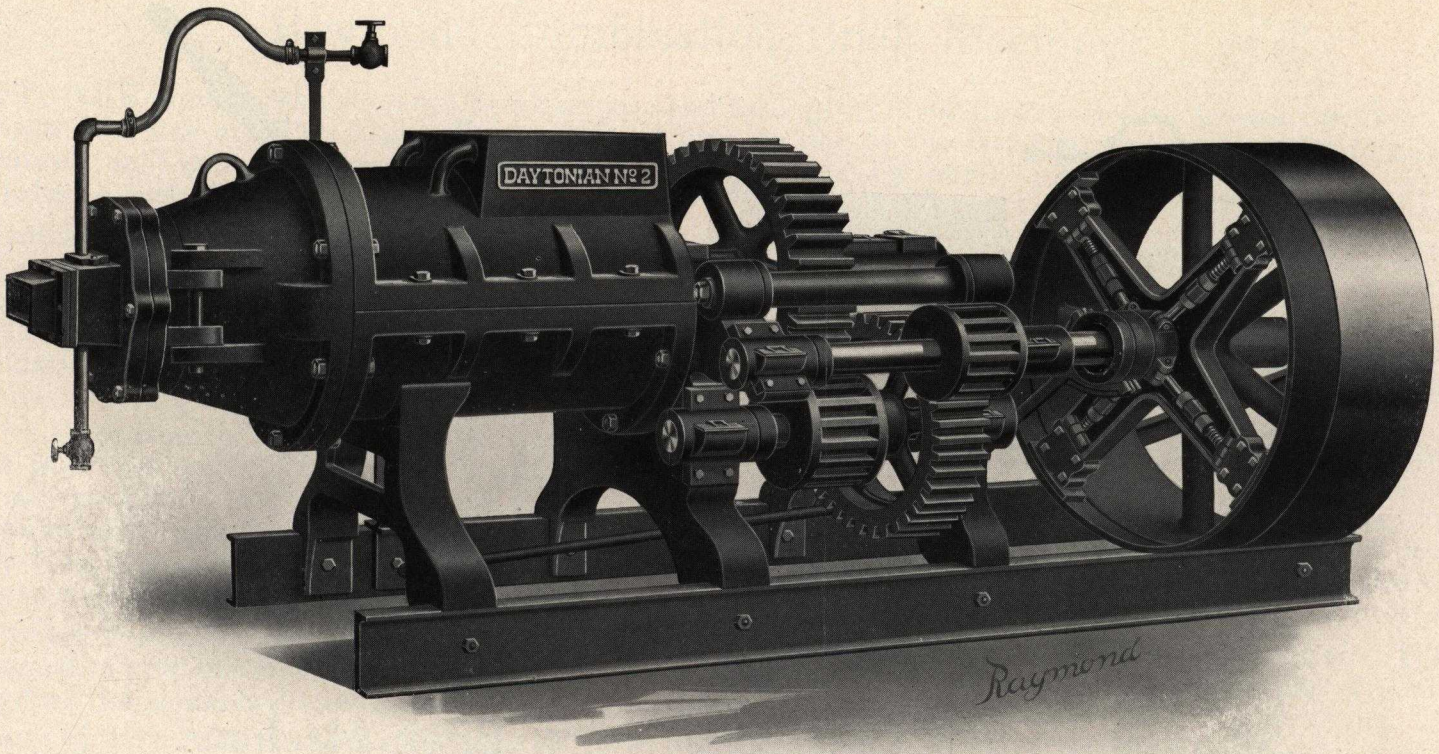
The Raymond "555" Brick Machine.

THE CONSTRUCTION of the "555" Brick Machine is somewhat of a digression from our regular line, the main frame being of a box pattern, and is cast in one solid piece from the skids to the top. The gears are fitted in a most approved manner and so arranged as to take up their own lost motion.

The machine can be worked continuously to the full limit of its capacity as its strength fully warrants it. The steel skids are extended to sufficient length to include the out board bearing, making the machine entirely contained within itself.

The shaft is of heavy steel running in generously large longitudinal bearings which have the caps machine fitted into their seats and all bolts equipped with spring lock washers. The back pressure or thrust is taken up by a submerged type thrust bearing.

The "555" is the most convenient and compact machine of its size now before the public and can successfully be used in connection with our No. 2 Automatic Cutting Table, however, in that case, extra driving attachments must be provided which are not furnished with the machine. Its rated capacity is from 20,000 to 40,000 standard size brick in ten hours and it is furnished with a four arm type friction clutch pulley 34 inches in diameter by 10 inch face. It should run 200 to 225 revolutions per minute. The machine is 12 feet long, 5 feet 5 inches wide and 4 feet 4 inches high. Approximate weight 9,000 pounds.



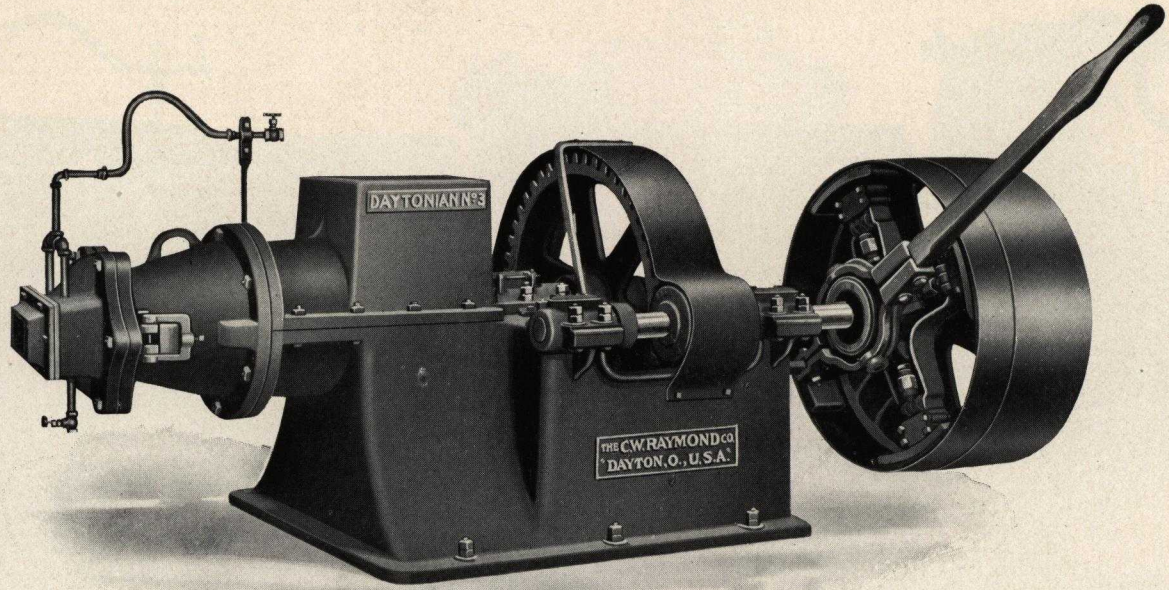
The Raymond Daytonian No. 2 Brick Machine.

THIS MACHINE has become a general favorite wherever it has been installed and it is built upon the usual lines of our machines of larger power.

One feature of its popularity, aside from its rigid construction, is the versatility of its products, which include all manner of face, common and paving brick as well as fire brick and shapes. Its uniform smooth column produces a brick which meets the hearty approval of any market. In fact, many users of the Daytonian No. 2 are manufacturing a face brick closely rivaling that of the press brick manufacturers.

The Daytonian No. 2 is well proportioned and built with liberal strength in all its parts. It is mounted on steel skids and self-contained. The safety shearing device and submerged type thrust bearing are built with the same care as the larger machines.

It is furnished with a four arm type friction clutch pulley 34 inches by 10 inches which should run from 200 to 250 revolutions per minute. It is 10 feet 6 inches long, 4 feet 8 inches wide and 3 feet 7 inches high. The rated capacity is 15,000 to 20,000 standard size brick per day. Approximate weight 7,000 pounds.



The Raymond Daytonian No. 3 Brick Machine.

THE MACHINE has been but recently reconstructed and provided with heavier shafting and unusually large journals, giving it greater strength throughout. It is built upon a solid base made in one piece, insuring the utmost rigidity. While on account of its size, its capacity is limited, its product is fully equal in quality to that of the larger machines.

It has become a great favorite in the larger plants where considerable shape work is done in small quantities. With this Daytonian No. 3 placed conveniently, odd shapes and sizes may be made on it, while the larger machines on the standard products need not be disturbed.

It is furnished with a safety shearing device, anti friction thrust bearing, four arm type friction clutch pulley 34 inches in diameter and 10 inch face which should run from 200 to 250 revolutions per minute. The length is 9 feet 3 inches, width 5 feet 1 inch and height 4 feet. Rated capacity is from 10,000 to 20,000 standard size building brick per day. Approximate weight, 4,200 pounds.

Raymond Combination Brick Machines.

THERE ARE many brickmakers whose experience and taste gives them great partiality toward the Combination Brick Machine and Pug Mill. This preference may be due to the fact that their environments have been entirely with this class of machinery or it may be occasioned by purely local circumstances. It is, nevertheless a fact, that the single compact machine presents many alluring features over the segregated ones.

There are many arguments in favor of the uniting of the Brick Machine and the Pug Mill into one rigid structure, and possibly the greatest reason for its adoption by many is the simple fact that one belt is required to operate both machines. This very naturally lessens the cost of installation and maintenance, and occasionally a material is found not requiring previous preparation, allowing the Combination Machine to be belt connected direct to the engine, thus eliminating all line shafting. Other points of advantage are, that there is but one foundation to construct and that no superstructure is required to support the Pug Mill.

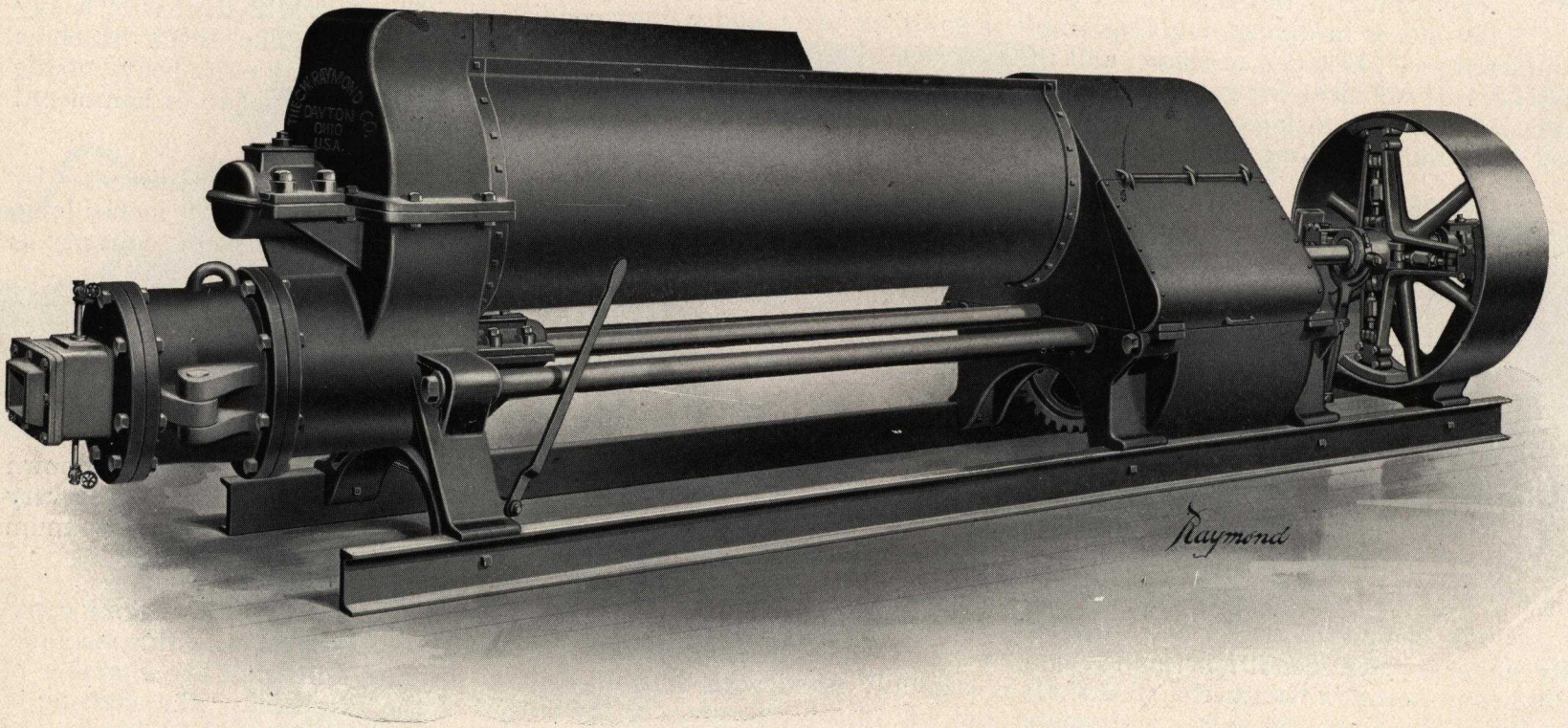
With these facts in mind and the desire to meet the views of all customers, we build a complete line of Combination Brick Machines and Pug Mills, which consists of three different sizes and are known as the Raymond Combination Special, the Raymond Combination No. 1, and the Raymond Combination No. 2. In the design of this line, we have thoroughly carried through it the Raymond Standard of Perfection, and for this reason, they have met with unparalleled success since their inception. They are arranged so any of our Automatic or Semi-Automatic Cutting Tables may be used with them as well as the Hand Cutters. The general merits of each machine are largely similar.

In construction they are all built on steel channel skids with heavy frames resting directly thereon. The gearing is designed to give the maximum power with the least initial energy. The shafting is a high grade of cold rolled steel excepting the hammered steel main shafts of the Brick Machine and Pug Mill.

Many of the details are similar to those of the separate machines, and all of their good features are embodied in the Combination line. The safety shearing device is in evidence which prevents the breaking of the machine, should foreign matter enter the die or the material become too stiff. All of them have the same carefully machine fitted caps with generously large bearings. The through going bolts securely tie all sections of the machine together and vibration is thereby eliminated.

One point of considerable annoyance to Combination Brick Machine users, is the packing of the clay in the throat of the machine entailing not only a diminished capacity, but a repair expense way beyond that occasioned by reasonable wear, because of the packed material breaking the knives and wipers. In order to avoid trouble of this kind and profiting by the errors of others, we have designed the throat of our machines with plentiful space for the material to pass through, thus eliminating one of the great disadvantages of a Combination Brick Machine and Pug Mill.

The same dies that have been previously described are used with the Combination Brick Machines and the interior construction is subject to the same variations as the single machines.



The Raymond Combination No. 2 Brick Machine.

The Raymond Combination No. 2 Brick Machine.

IN THIS MACHINE we have attempted to build a departure from a more or less stereotyped form of construction of combination machines, and have utilized the experience gained by others, overcoming errors which were found to exist in numerous plants using this class of machinery.

From the foundation up, the machine is built heavy and massive to withstand shocks and vibrations of constant use. It is mounted on steel skids extending to sufficient length to take in the outboard bearing, uniting the component parts into one rigid structure. The gearing has a larger ratio than has been used heretofore on machines of this rating, insuring a full margin of safety to withstand all overloads which may reasonably be placed upon it. The framework is of the solid box type throughout, reinforced with stretcher bolts and supports the pug mill chamber directly on the skids.

In detail the pug mill chamber is rolled in cylindrical form with the usual flaring edges omitted. The forward end above the chamber of the brick machine is entirely open and unobstructed, admitting of no place for the clay to pack and ultimately break the wipers. The pug mill shaft is of hammered steel, hexagon in shape, around which the pug mill hubs are clamped, these being made in such a manner that one can be removed and a new one inserted without disturbing any of the remainder. This pug mill shaft has a marine bearing at both the forward and rear ends, thus dividing the thrust strain equally and tending to preserve the strength of the component parts of the machine.

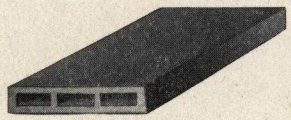
The main shaft is of heavy cold rolled steel fitted at the rear end with a marine thrust, while the forward bearing is adjustable in all directions, providing for exact alignment at all times.

The gearing is completely housed by a cast plate at the rear, covered by a boiler steel plate rolled to shape. A large portion of this cover is hinged which can be turned back should the gearing need any attention.

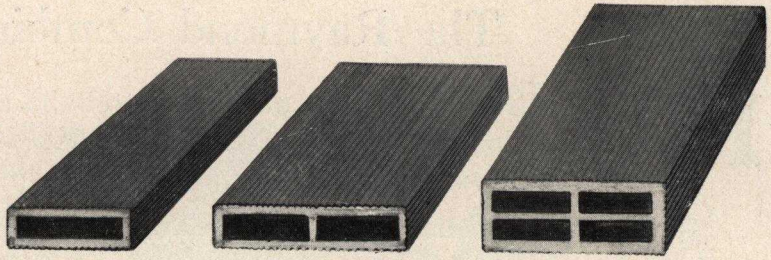
The pug mill chamber is 9 feet long. The machine occupies a space 17 feet 8 inches long, 5 feet 5 inches wide, 4 feet 10 inches high and is furnished with a 42 inch by 12 inch four arm type friction clutch pulley which should run 150 revolutions per minute. Rated capacity 20,000 to 35,000 per day. Approximate weight, 11,500 pounds.

Fireproofing Made on Raymond Holloware Machinery.

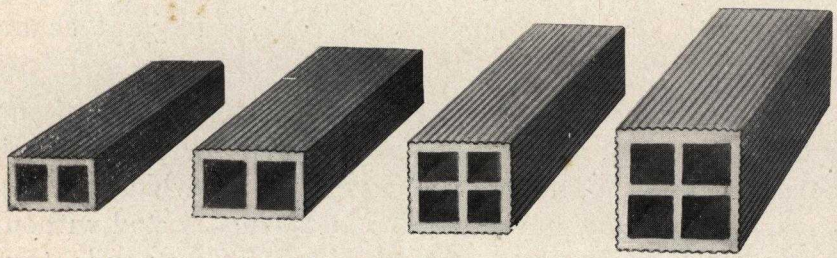
Book Tile



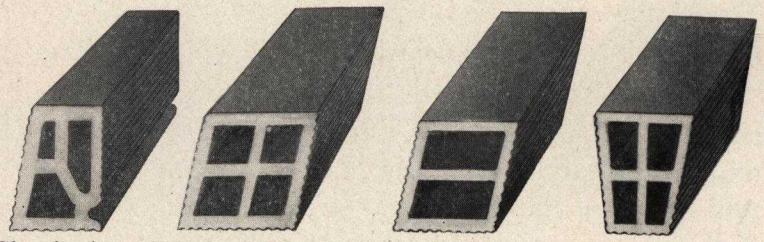
Floor Tile



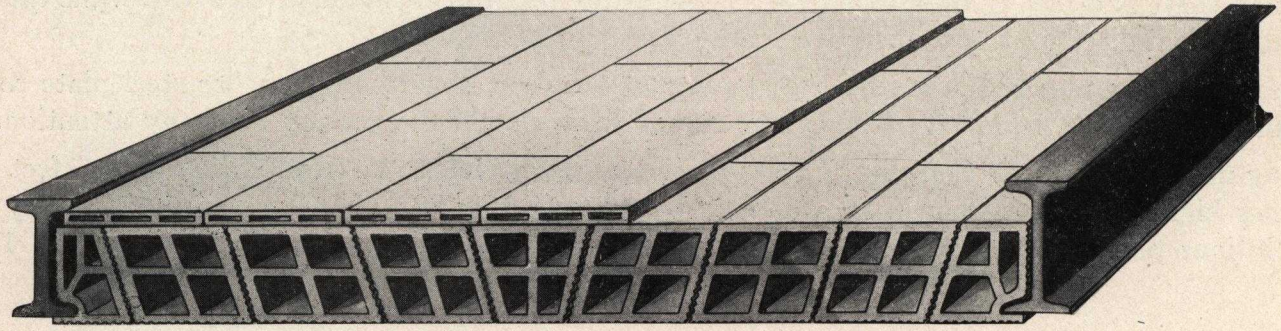
Partition Blocks



Partition Blocks



Skewback Standard No. 1 Standard No. 2 Key



Flat Arch

Raymond Holloware Machinery.

THE RAPIDLY increasing use of holloware in our large skyscrapers has led us to devote considerable time and energy in the development of successful machines for this class of ware. In times past clay machinery manufacturers have filled orders for machines of this character with brick machines to which were attached holloware fronts and dies. This has always produced unsatisfactory results. As has been the case with other equipment for the manipulation of clays, we have been the first to succeessfully design a machine which overcame all of the problems confronting the holloware manufacturer.

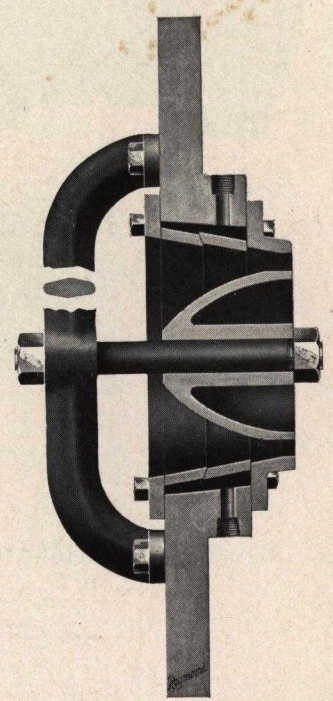
As a result we are now offering to the public four machines, which for output and class of work produced, have never been approached in the making of fireproofing, drainage tile, electrical conduit, building blocks, and other holloware products.

Our illustrations on the preceeding page show some of the more common styles of fireproofing, however, in our design of machines, we are prepared to take care of the most intricate shapes that may be required, including everything that can possibly be termed holloware.

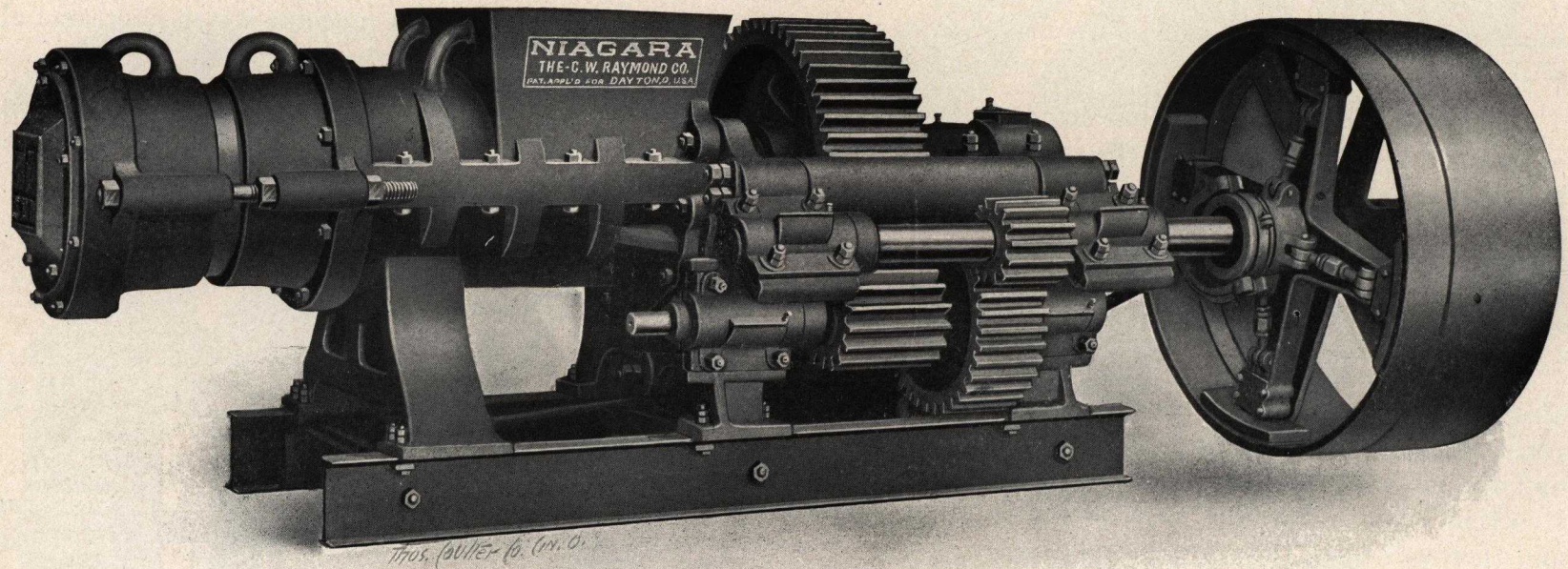
All of these machines are built on the same massive lines as our brick machines. The shafts are all steel and the thrust bearings are our improved submerged type and, as generally constructed, they utilize, wherever possible, parts that have been proven sufficiently strong and durable, the principle changes being in the design of the barrel, the augers and interior construction. These features were placed upon the market only after exhaustive experiments and thorough tests, therefore, placing before you machinery demonstrated by experience to be fully equal to all demands that can be made upon it.

All of these machines are self contained, mounted on channel steel skids, excepting the Nonpareil which is of a different design. The gearing is thoroughly strong and carefully proportioned to give easy running qualities.

We also manufacture complete holloware dies of such design as to work successfully with our machines however, as each individual clay and condition requires a specially constructed die in order that the best results can be obtained, we make them only to order and no dies are furnished with any of our holloware machines.



Lubricating Tile Die



The Raymond Niagara Holloware Machine.

The Raymond Niagara Holloware Machine.

IN THE NIAGARA we present our heavy duty Holloware machine. It is particularly suited to the manufacture of holloware, fire-proofing, etc. The products that can be made on this machine are varied, in fact, include almost everything in plastic material that can be made on any auger machine.

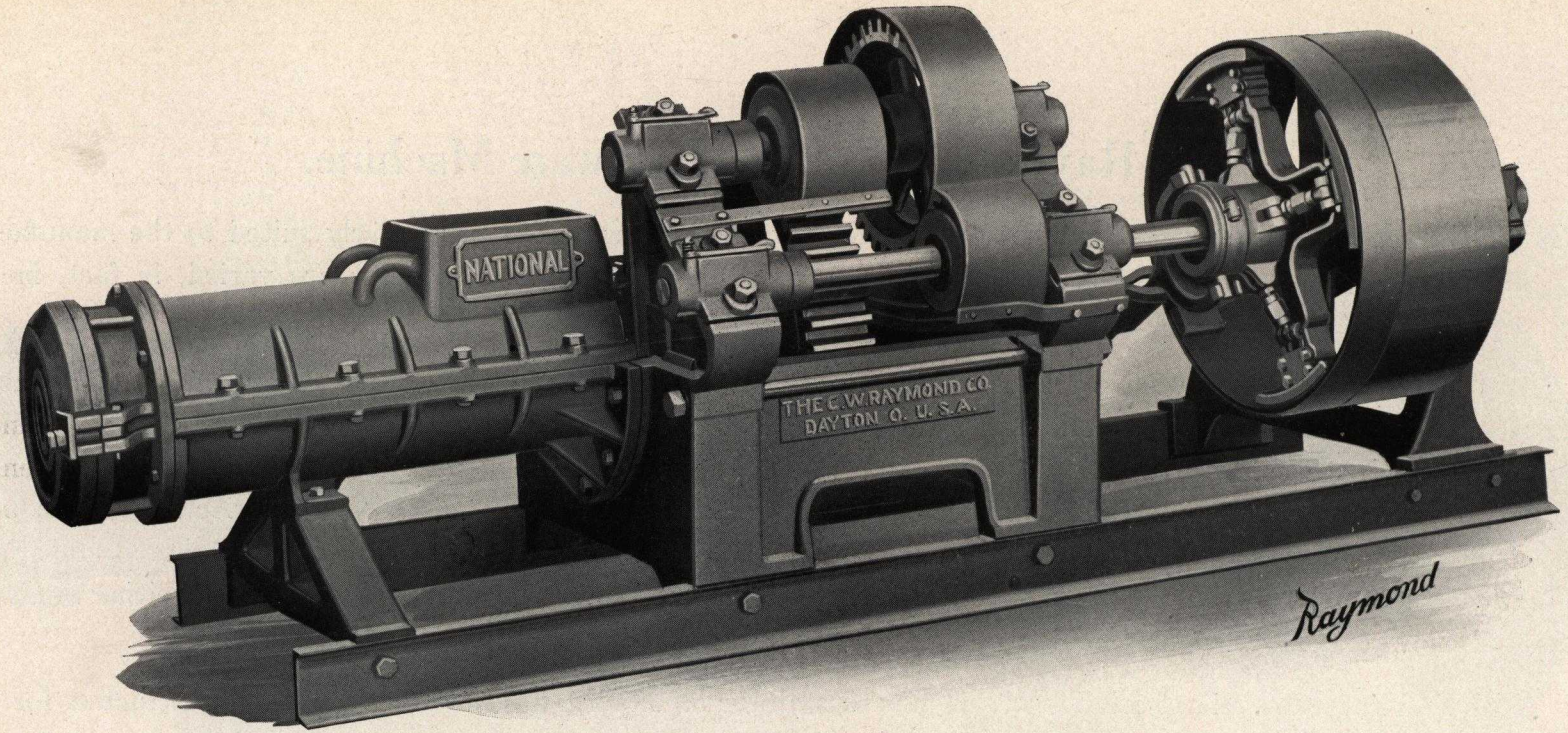
The Niagara is built with a telescoping or adjustable front by which the relative distance between the die and auger can be changed and established accurately and instantly, thus conforming it to any style of die or kind of material. By this peculiar construction we avoid the time killing necessity of inserting cast iron rings between the die and auger in order to adjust the distance to suit the particular die or material. The interior is so constructed that it gets the material in front of the auger without compression, allowing all the force of the machine to be applied at that point. It is so massively constructed that it is equal to any duty that may be required of it, either in making brick or holloware. It is essentially a long life and heavy duty machine.

The driving pulley is of friction clutch pattern, and like all other parts, is especially constructed for this machine. It is 48 inches in diameter by 14 inch face. Should be run from 200 to 250 revolutions per minute.

When erected for operation it occupies a floor space of 13 feet 4 inches in length, 6 feet 2 inches wide. It is 4 feet 4 inches high. Approximate weight 11,500 pounds.

Its capacity depends largely upon the material to be worked and the style of die used, however from 40,000 to 60,000 brick in 10 hours or a proportionate weight in holloware is an easy rating.

No dies are furnished with the Niagara Holloware machine, as various materials and conditions require special arrangements. They are invariably made on separate specifications.



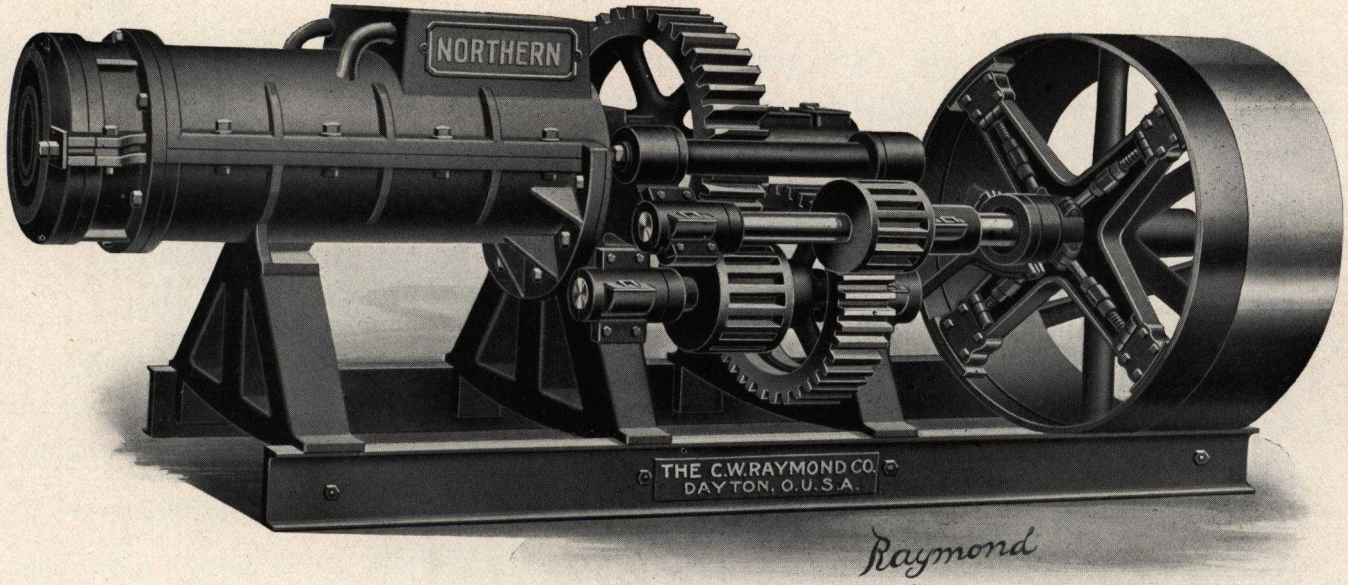
The Raymond National Holloware Machine.

THE GROWING favoritism for holloware, hollow blocks, and drainage tile and kindred products, brought us to the creation of the National Holloware Machine.

The National is a direct decendant of the "555" Brick Machine, the difference between the two being in the interior construction and barrel to meet the conditions necessary in the manufacture of hollow products. The front or nozzle is so arranged as to be capable of taking in the large holloware dies within range of the machine.

The product of the National is greatly diversified, as it will make any of the standard holloware shapes, drainage tile, hollow blocks, chimney blocks, fire proofing, haverstraws, in fact, anything which may be termed holloware.

The machine is furnished with a four arm type friction clutch pulley 34 inches in diameter by 10 inch face, which should run 200 revolutions per minute. The length is 11 feet 3 inches, width 5 feet 5 inches and the height 4 feet 4 inches. Capacity is entirely dependent upon the material being used. Owing to variation in design, no dies are furnished with this machine, but are subject to special specifications. Approximate weight 9,000 pounds.



The Raymond Northern Holloware Machine.

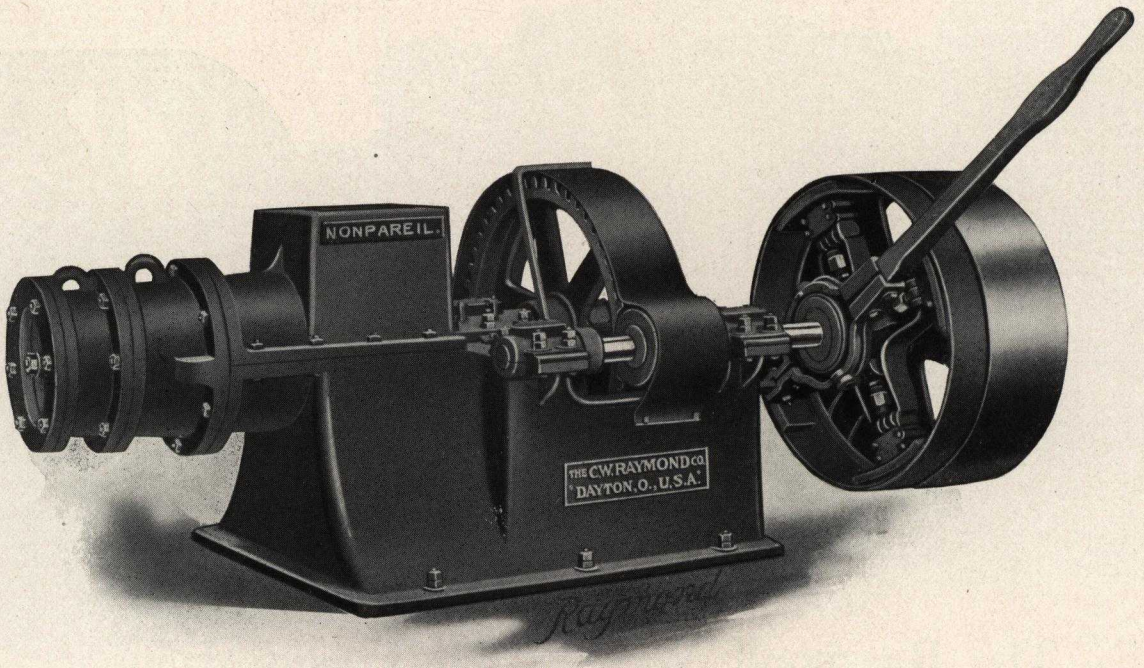
THIS MACHINE is fully capable of performing the work required of it and it is built with the same care that is so manifest in all of our machinery.

It is self contained and is equipped with a submerged type thrust bearing sufficiently strong and well made to resist the enormous back pressure occasioned in the manufacture of holloware and tile.

It is successfully making many of the large sizes of holloware, but has won its most pronounced popularity among the drainage tile manufacturers.

The Northern Holloware Machine is a replica of the Daytonian No. 2 Brick Machine with the exception of its interior construction and barrel, which changes are necessary to meet the requirements in the manufacture of its product. It is 9 feet 6 inches long, 4 feet 8 inches wide and 3 feet 7 inches high. It is furnished with a four arm type friction clutch pulley 34 inches in diameter by 10 inch face, which should run 200 to 250 revolutions per minute. Approximate weight 7,000 pounds.

Owing to the great variation in the size, style, etc., of holloware dies, no dies are furnished with this machine, except on separate specifications.



The Raymond Nonpareil Holloware and Tile Machine.

THE NONPAREIL is nearly a duplicate of the Daytonian No. 3 Brick Machine, and it contains many of its worthy features, including the solid base and submerged type thrust bearing.

The machine has been placed in many clay works and thousands of feet of drainage tile are made upon it every day. When a machine of this class is desired, a closer investigation will reveal that it is as well made and constructed of as good material as could be put into a holloware machine of any size.

It is furnished with a four arm type friction clutch pulley 34 inches in diameter by 10 inch face, which should run from 200 to 250 revolutions per minute. It is 9 feet 3 inches long, 5 feet 1 inch wide and 4 feet high. Approximate weight 4200 pounds.

Owing to the great variation in the design of holloware dies, no dies are furnished with this machine, except on separate specifications.

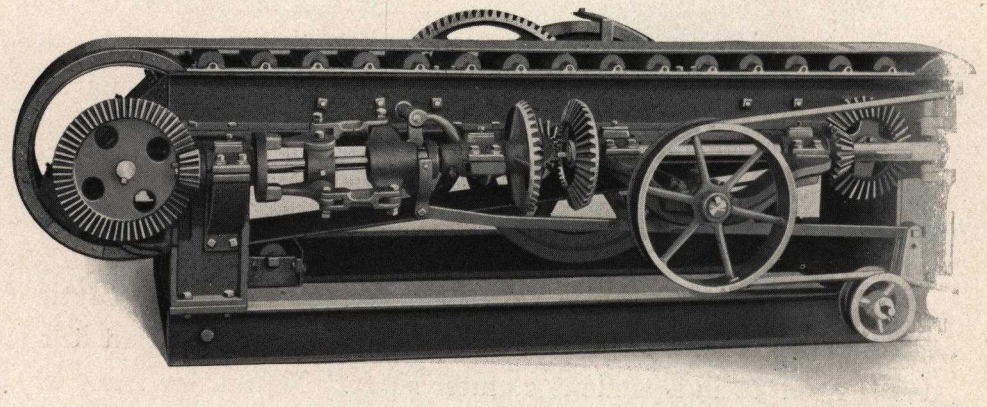
Raymond Automatic Cutting Tables.

IT IS universally admitted that the cutting table is the most important machine in a stiff mud brick plant, requiring a nicety of operation, freedom from breakages and dependability. Most of the shut downs and delays can invariably be traced to this machine, the trouble with which has been largely due to the lack of a perfect automatic governing device and to the breaking of the machine caused by the racking of the intermittent motion of the cutting reel. It is manifestly wrong to suppose that the life of a machine, the moving parts of which weigh a ton or more, coming from a full stop, traveling approximately four feet at the rate of 300 revolutions per minute, then coming to a full stop suddenly, is as long lived as where this condition does not exist.

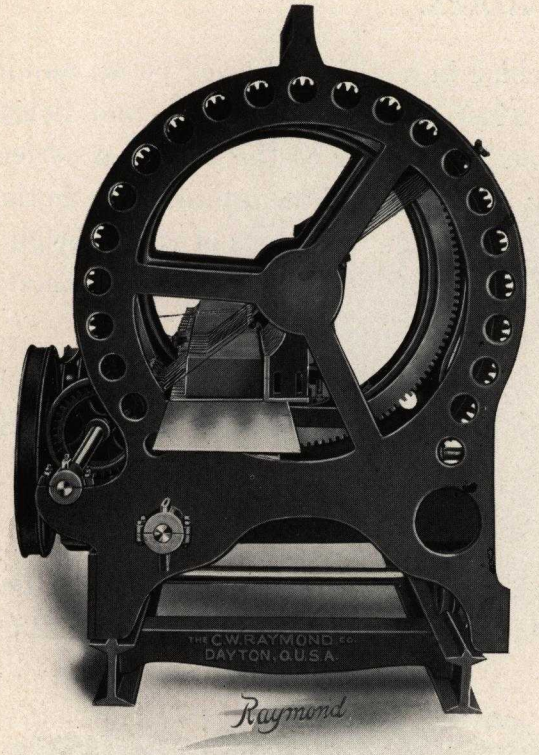
In the Raymond Automatic Cutting Tables all of these troublesome features have been absolutely and entirely eliminated in the perfect automatic governor and the continuous motion of the reel. These ideas are found only in our cutting tables and are the subject matter of numerous patents in this country and others.

The tables consist of the usual measuring, cutting and off carrying sections.

The measuring section which first receives the moving bar of clay from the brick machine, consists of a belt supported on rollers, the power control and governing mechanism. The automatic governing device, which is illustrated, is actuated and absolutely controlled by the movement of the clay column over the belt and regulates the entrance of the power into the machine, thus controlling the entire speed of the cutting table so as to cut the clay bar into brick of the proper thickness, and at the same time control this operation so accurately that the machine will cut absolutely straight and perfect brick at all speeds, even though the motion of the clay column be reduced to practically nothing. This latter point is one of the



Automatic Governing Device.



Showing Shearing Travel of the Wires.

most important features of the Raymond Automatic Cutting Tables and is one which is not found in any other machine of this type.

The second, or cutting section, consists mainly of a revolving reel upon which the wires are strung and which contains the necessary platen hangers for supporting the clay column. Another matter of considerable interest is the location of the axis of the revolving reel in relation to the back of the platen hangers, which is such that the motion of the wires through the column is a shear cut downward from the face and inward from the end of the brick, leaving the clay bar in the same relative position making an absolute downward shear cut entirely through the brick. This movement insures the very best face and ends preventing feathered or frayed edges and removing the least amount of material from the path of the wires.

The rotary movement of the reel is continuous and in one direction, a most important feature, which eliminates all the unnecessary jar of the intermittent motion, preventing the constant concussion to all parts of the machine, which is occasioned by that principle. This not only adds to the life of the machine, but gives an even constant movement, eliminating all strain and allowing even wearing of all parts.

The endless off carrying belt supported on rollers and running at a higher speed than the clay column makes up the last section. After the brick are cut they pass under this belt and are automatically separated from each other and carried to the repress or dryer car.

All of the power for operating The Raymond Automatic Cutting Table is taken from the brick machine through a tumbling shaft, or should conditions be such that it is more feasible, the cutter can be arranged to be driven direct from an independent counter shaft. No matter from what source the power is taken the machine is so constructed that the clay column absolutely governs its speed, consequently, there can be no buckling, upsetting or

breaking of the column. This point makes the machines self regulating whether cutting at the rate of 20,000 or 200,000 per day.

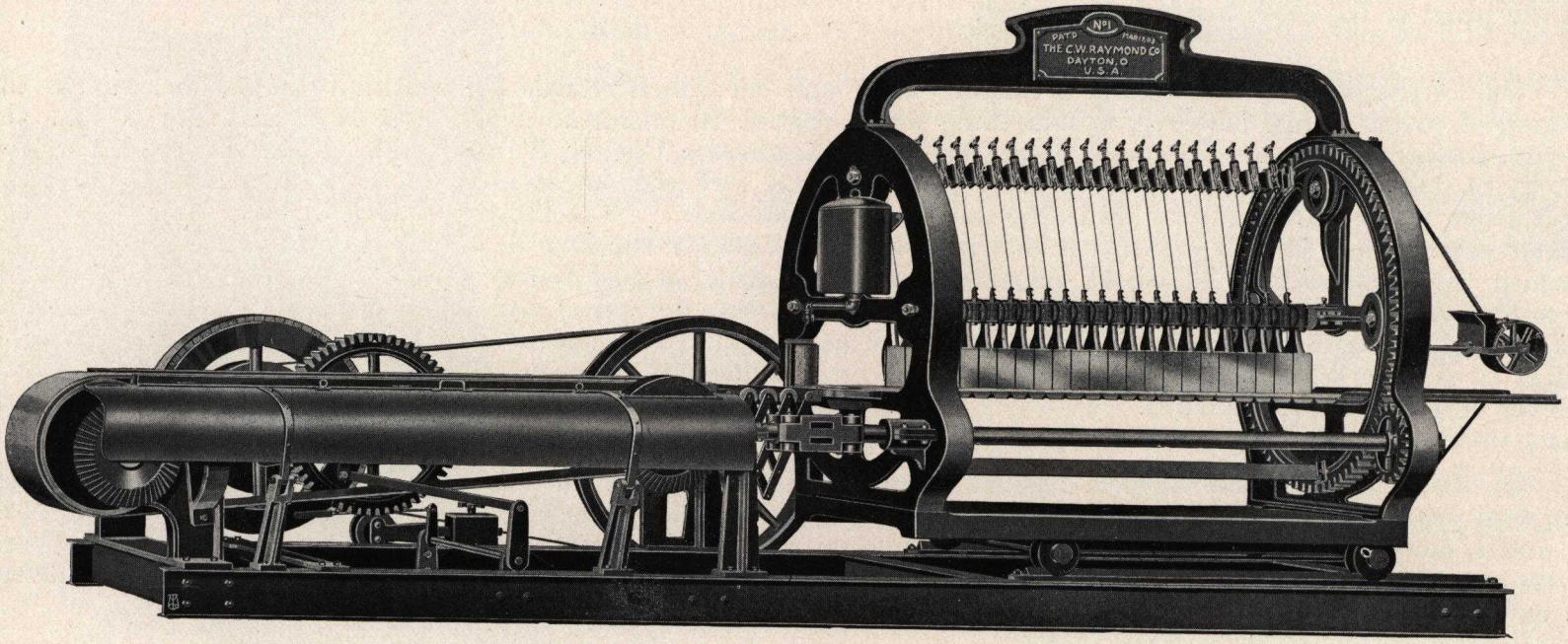
No cutting tables have ever been devised that offer as many advantages to the brick manufacturer as do the Raymond Automatic Cutters. They represent the highest state of perfection in their class today, producing brick that are equal to the most carefully repressed.

One of the petty annoyances of a Cutting Table and one which retards the continuity of its operation is the breaking of wires. This, however, is something which cannot be overcome on account of their thinness and the amount of wear on them. The speed of the Raymond Automatic Cutting Table reel when running at its highest capacity is slow enough to allow the operator to replace the wire without stopping the machine, in fact, an expert operator can replace several wires while the machine is in motion. To facilitate his work we have designed a wire fastener entirely new in its operation and principle. This fastener consists of a rigid clamp around the outer bar in which the hook slides. This hook has a rack cut into it, which is operated by means of a small pinion and lever. The pulling down of this lever exerts sufficient force to compress the spring and lower the hook. On replacing the wire the spring tightens it and brings the lever back to position and holds the entire tightener in place. There is nothing to get out of order and the power on the lever is sufficient to overcome the most powerful tension which will ever be used on cutting wires.

On many plants where there is a demand for various size brick, the Raymond Automatic Cutting Tables meet with great approval from the simple fact that the entire set of platens can be lifted bodily from their position and a new set inserted. In making this change no readjustment of the cutter is necessary and nothing new but the set of platens required. By taking off two caps at the end of the platen hangers, the whole set is removed. The entire time required, including rewiring, should not be over fifteen minutes.

The smooth continuous movement and absolute absence of jar reduces the repairs to a minimum and insures a longer life than any other machine of its type. They will cut brick of any size or thickness, such as standard, building brick, paving brick, Romans, Normans, Pompeian, etc.

That these machines have long since passed the experimental stage, is amply shown by the fact that hundreds of them are in active service, successfully working in all kinds of material and under all conditions and being cared for by all classes of labor, from skilled mechanic to convict, and in every case the Raymond Automatic Cutters are meeting with unparalelled success and working to the entire satisfaction of all users.



The Raymond No. 1 Automatic Cutting Table.

Covered By United States Letters Patent.

The Raymond No. 1 Rotary Automatic Cutting Table.

THE NUMBER 1 Automatic Cutting Table is the highest ideal of large capacity cutters. Its capabilities reaching to the enormous output of from 100,000 to 200,000 standard building brick in ten hours, with a proportinate capacity of paving brick, paving block, Romans, Normans, etc.

Every care is taken to produce only the highest class construction in this magnificent piece of mechanical skill, and in the accuracy of workmanship and precision it closely rivals a modern Corliss engine or electrical dynamo and but few working parts characterize its make up. In this respect it is a marvel, eliminating a great number of wearing parts which means a minimum maintenance expense.

In general, it follows the lines previously explained, and the governing mechanism is so sensitive that even the slightest variation in the movement of the clay column is felt throughout the entire machine.

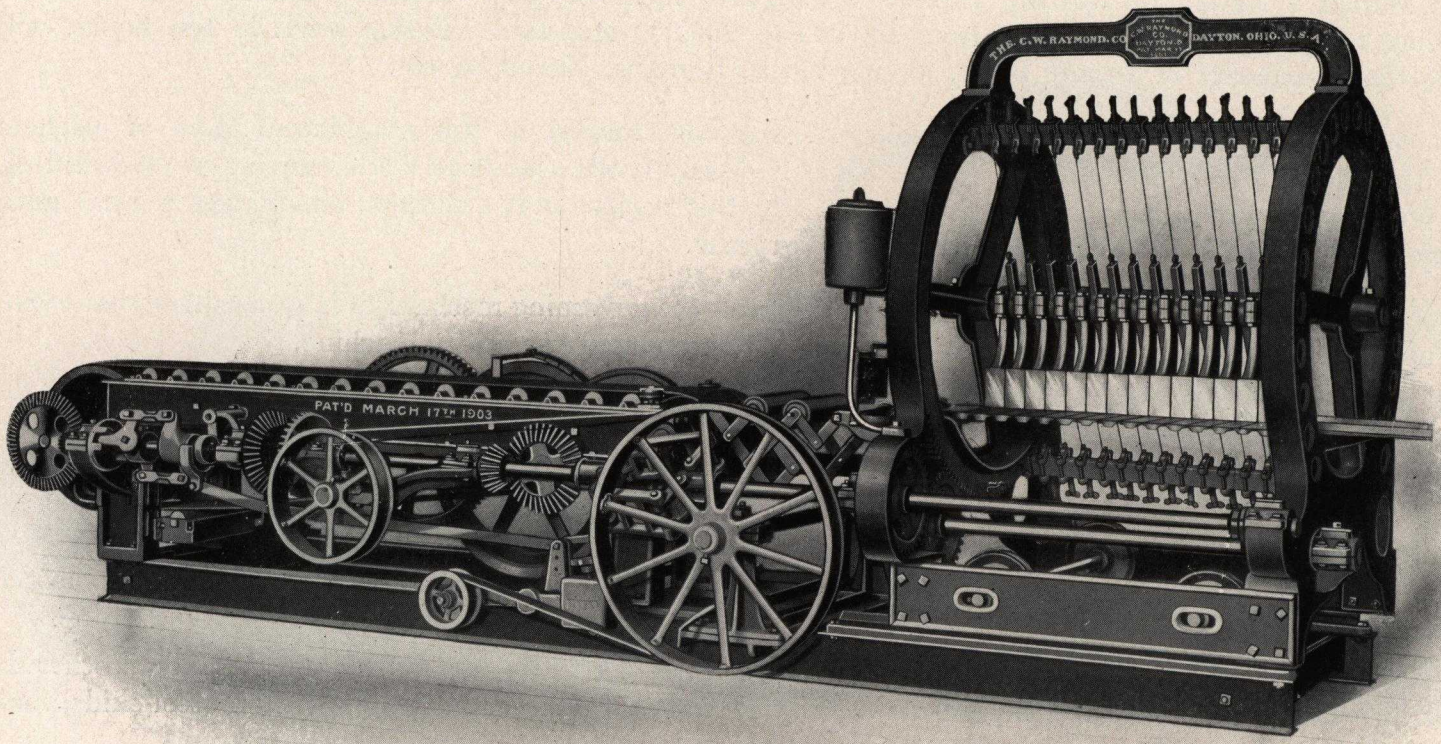
The No. 1 cutter has but one set of cutting wires and cuts twenty-three brick at each revolution of the reel and by the carefully designed governing device it cuts positive, straight and true leaving no feathered or frayed edges and with the least amount of material removed from the path of the wire. The travel of the wires in cutting is an absolute downward shearing motion at all times.

The movement of cutting reel is our well-known and perfectly demonstrated continuous motion, no lost time being taken for starts or stops, but a constant, steady, even travel at all times.

Steel shafts are used throughout and at the point of greatest power steel pinions are used, and all other materials entering into the construction of the machine are of the highest quality. It is mounted on steel skids, making it entirely self contained and always in perfect alignment.

Length over all, exclusive of the off bearing belt, 17 feet 3 inches, width over all 5 feet 8 inches, height to top of measuring pulley 30 inches. If cutting table is driven independent of the brick machine, the driving shaft should be operated at the rate of 100 R. P. M. Weight approximately 9000 lbs.

The standard off bearing belt is 15 feet, but it can be made any desired length.



The Raymond No. 2 Automatic Cutting Table.

Covered By United States Letters Patent.

The Raymond No. 2 Rotary Automatic Cutting Table.

THE Raymond No. 2 Rotary Automatic Cutting Table has proven to be one of the best sellers of our entire line of Clay Working Machinery. This is due to its perfect operation and popular capacity of from 30,000 to 100,000 standard size building brick in ten hours, or an equal quantity in other sizes and shapes. It will cut pavers, Romans, Normans, Pompeiian, etc.

Its construction is of the same high class as all Raymond machinery and it is built with few working parts, all of which are on the outside of the machine, away from the dirt and easy of access.

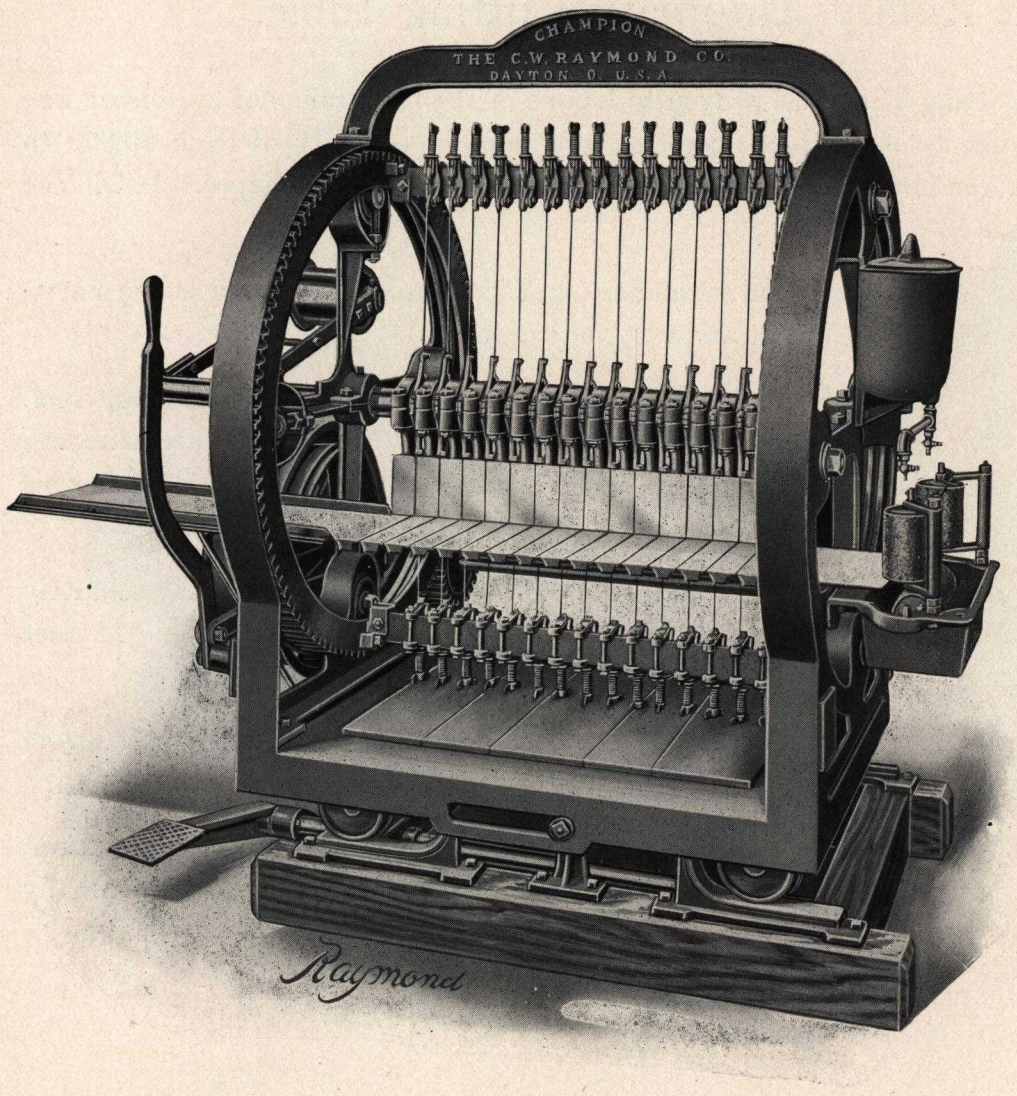
It has two sets of cutting wires which cut 13 standard size brick at each half revolution of the cutting reel. It cuts them positive, straight and true, entirely without torn or frayed edges. The cut is a downward shearing movement from the outer and upper corner of the brick to the inner and lower corner, leaving the column in this same relative position.

The movement of the reel is our well known and patented continuous motion, the speed of which is absolutely controlled by the movement of the clay column and steel shafts are used throughout the entire machine. In fact all materials which enter into its construction are of the very highest quality.

The machine is mounted on steel skids making it self contained and assuring perfect alignment under severe conditions.

The No. 2 Automatic Cutting Table weighs approximately 7500 lbs. Its width over all is 5 feet 7 inches. Height 6 feet 10 inches, length, exclusive of off carrying belt is 16 feet 6 inches. 15 feet of off carrying belt is normally furnished, however this can be made any desired length. Should it be necessary to operate the Cutting Table independent of the brick machine, the driving shaft should run 100 R. P. M.

The Raymond Champion Face Brick Cutter.



IN MEETING the demands of architects' specifications for fine face brick, and where quantity is subordinate to quality, we recommend the use of the Champion Face Brick Cutter, which has been designed for the particular purpose of cutting strictly high quality brick, with smoothness and accuracy.

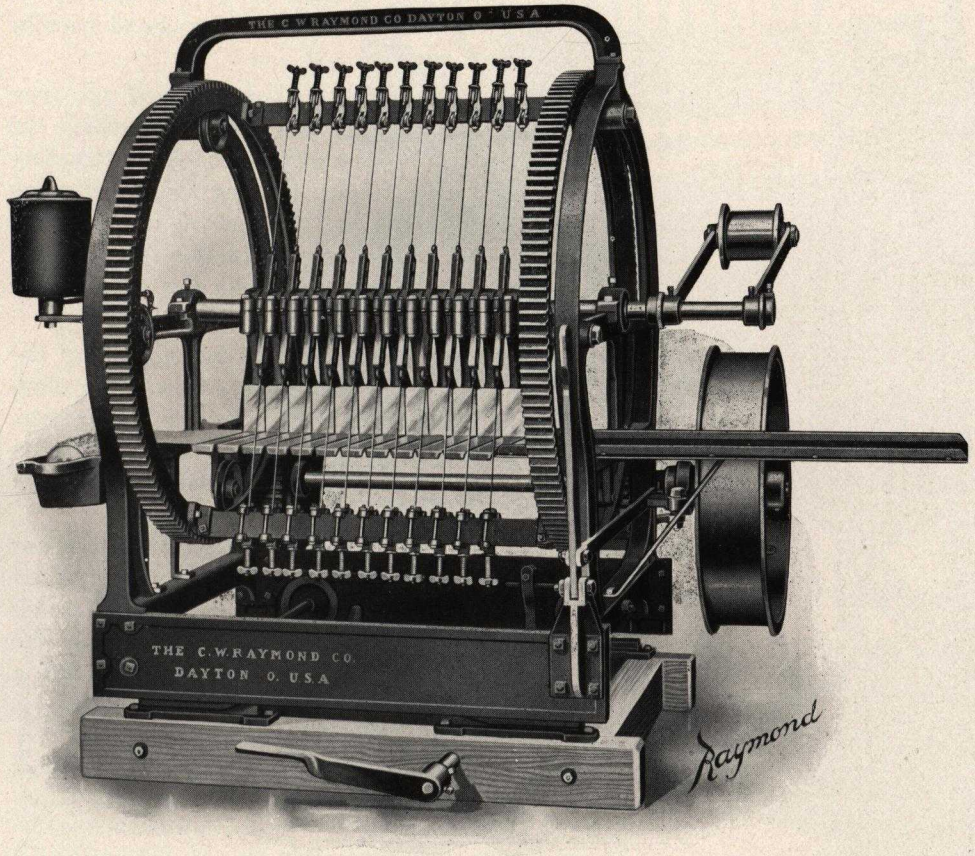
In construction, the Champion is equal to any Raymond Machine, every care being taken to produce a cutter which will meet the requirements for this class of work. The cutting reel is small, thus permitting the use of short wires, which minimizes the sagging and consequently makes a straight brick with as clear cut edges as can be made. The platens are set forward of the axis of the reel, and can be removed and replaced in a very short space of time, a very desirable feature.

In operation, the power is taken from the counter shaft onto a flange pulley which contains a cone friction. The operation of this friction starts and releases the cutter. By this construction, the machine is entirely in the hands of the operator at all times, so it is completely within his power to make the very finest ware that it is possible to produce on any machine. The capacity is also dependent on his skill.

Its length is 6 feet 4 inches, width 5 feet, height 6 feet. The approximate weight is 3,000 lbs. and the double flange pulley, which is 24 inches in diameter by 6 inch face, should run 40 to 45 revolutions per minute.

The pulley on the counter shaft should have a 12 inch face.

The Raymond Universal Cutting Table.



FOR THE BRICK maker with limited capacity who does not wish to install an Automatic Cutting Table, but desires a high class machine, we have to offer the Universal Cutting Table.

Its construction is strictly first class in every respect. Great care is taken to see that all parts are properly fitted. It is substantial and perfectly free from all vibration, insuring a long life and low cost of repairs. The platen hangers are quickly removed, and others substituted, making the change of one size brick to another, a matter of but a few moments.

It is operated from the line shaft and is always under absolute control of the operator.

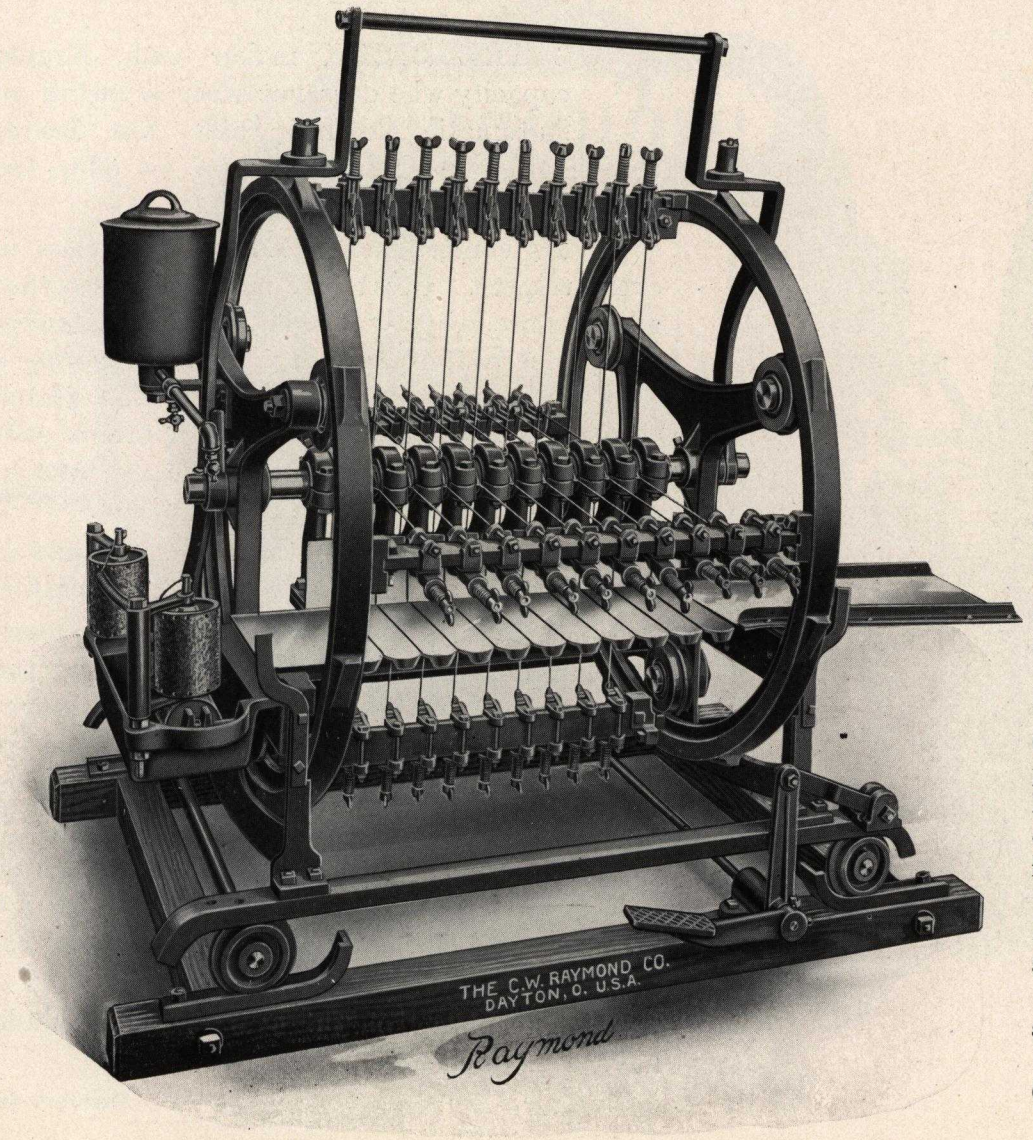
The Flange Pulley is fitted to the cone clutch, which is controlled by a lever at the right hand of the operator. The return movement is by means of a foot pedal.

The Universal weighs approximately 3000 lbs.

It is 5 feet 11 inches long, and 5 feet 8 inches wide. The double flange pulley, 30 x 6 inches, should run from 40 to 50 revolutions per minute.

The pulley on the counter shaft should have a 12 inch face.

The Raymond Hand Rotary Cutting Table.



HAVING fully demonstrated the practicability and usefulness of the Rotary principle of cutting brick in our Automatic and Semi-Automatic cutters, we have adapted it to a Hand Cutter to meet the demand for a hand machine for high class ware.

This cutter is mounted on a wood sub base with a track securely bolted thereto on which the machine moves horizontally. The superstructure is made by large angles forming the upper track on the flanged wheels and the base for the operating parts of the cutter. The construction is heavy and rigid, but entirely consistent with the work it has to perform and the power used.

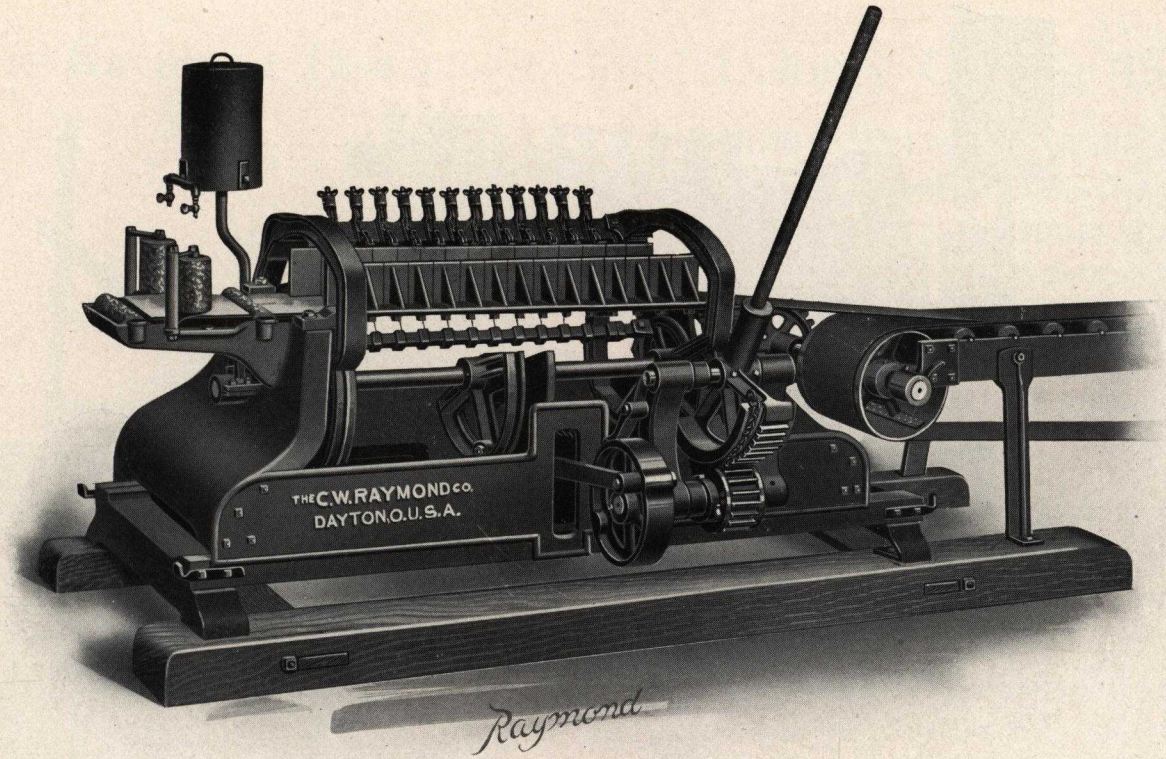
Precise and easy operation is assured by the accurate finishing of the rollers and rotating rings which form the basis of the cutting mechanism. The reel has four sets of cuttings wires which are operated by the hand lever attached to the center shaft.

The operation is very simple. When the bar of clay reaches the proper point the handle is pulled down until the reel is caught by spring latches provided for the purpose, the cut made and the handle returned. The wires cut the clay bar with a downward shear, leaving clean, smooth edges. A foot lever operates the carriage horizontally.

The machine is furnished regularly, with a 10 foot off carrying belt, oiling device and our standard wire fasteners.

It will handle a clay bar as large as 5 x 11 inches and nine 2½ inch brick are cut at one operation.

It is 5 feet long, 4 feet 6 inches wide and 4 feet 6 inches high. Its approximate weight is 2,000 lbs.

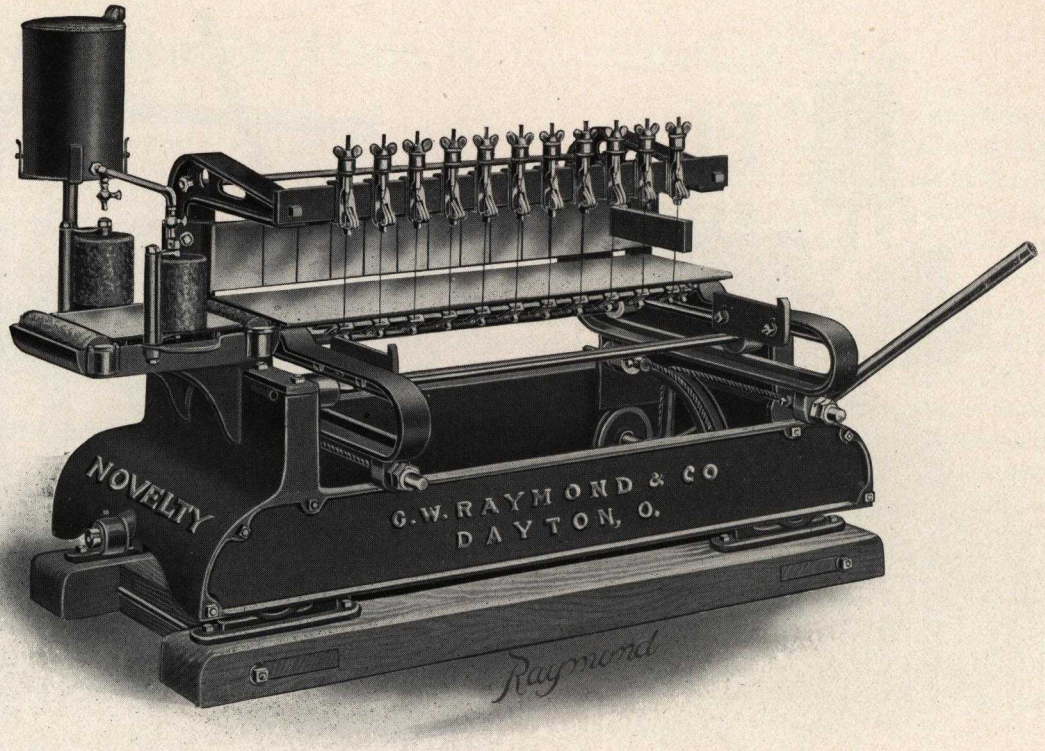


The Raymond Triumph Side Cutting Table.

IN THE TRIUMPH Side Cutting Table we have reached absolute perfection in this type of machine. It combines all the essentials of the perfect cutter, rapidity, a perfectly square and clean cut and remarkable ease of operation. The platens keep the clay column in line with the machine at all times. The cutting wires are stretched between heavy wrought iron bars supported by a circular moving frame, operating on a 2 inch steel shaft. It is self returning and cuts 10 to 12 brick at each operation of the lever. The cut is made with the downward stroke of the lever while the table is traveling with the column of clay. The upward stroke returns the table to position. After the brick are cut they are automatically spaced by the separating belt.

Its length, without off bearing belt is 6 feet 9 inches, width, with lever upright 4 feet, with lever down 7 feet. It is regularly furnished with a 10 foot separating belt. However, any length of belt can be furnished. Its approximate weight is 2500 lbs.

Its capacity is from 20,000 to 40,000 standard size building brick in 10 hours.



The Raymond Novelty Board Delivery Cutting Table.

THIS CUTTING table is remarkable for its simplicity. The number of working parts have been reduced to a point unequalled by any other machine on the market, yet its operation is positive, remarkably easy, and the brick are cut absolutely square and true.

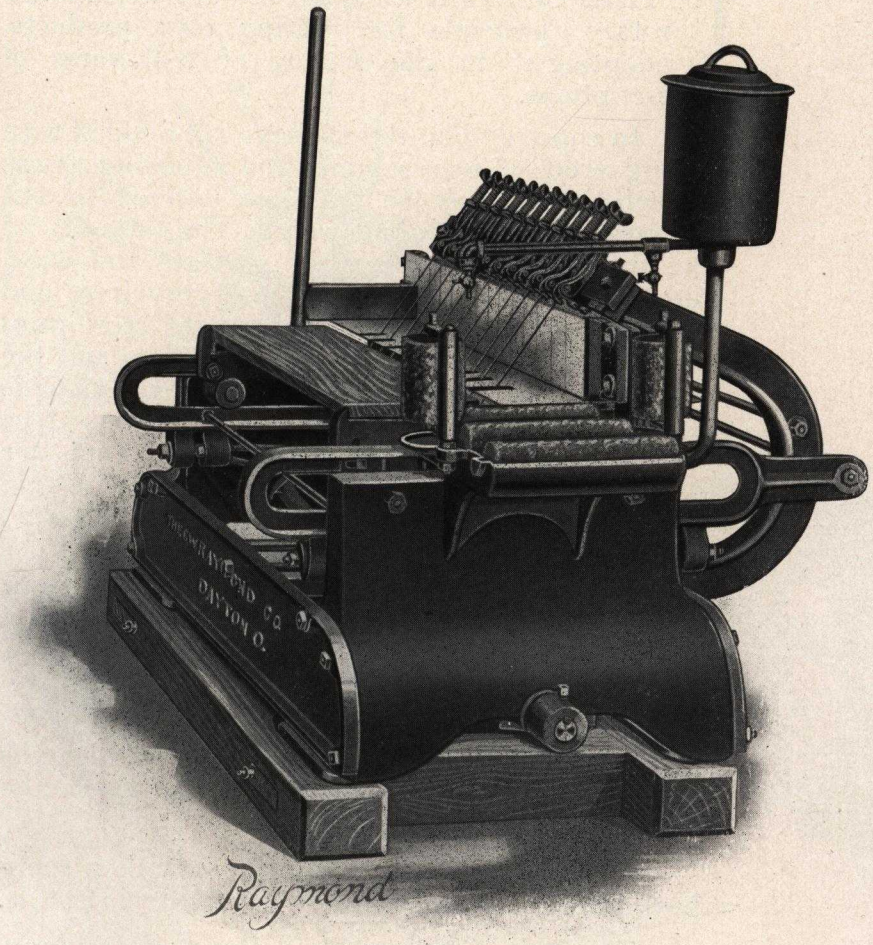
It operates by means of a frictionless movement of our own design, in which we use a wire cable running around the segment of a fluted wheel. Any lost motion can be instantly taken up by tightening a nut.

When a board delivery for side cut brick is desired this cutter will be found to be the most efficient machine that can be installed.

Its length is 6 feet 3 inches; width 3 feet, with lever down, 4 feet, height 3 feet 8 inches. Its approximate weight is 850 lbs.

Its capacity from 20,000 to 40,000 standard sized brick in 10 hours.

The Raymond Down Cut Board Delivery Cutting Table.



THIS CUTTING TABLE differs from our Novelty Board Delivery Table in that the brick are made with a down cut instead of a side cut, making them especially acceptable for fine face brick purposes.

It cuts ten brick at each stroke of the lever and delivers them on a pallet. It can be built as desired, either for right or left hand delivery—the cut shows delivery on the right hand.

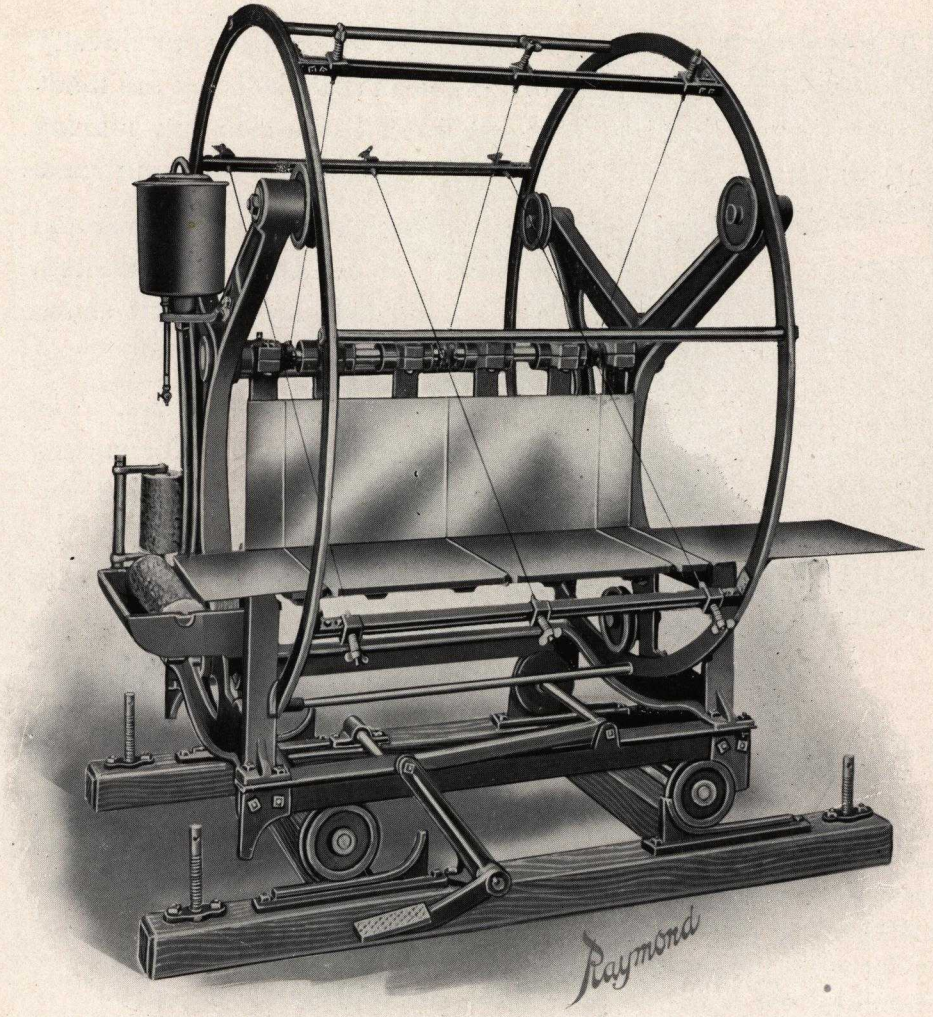
We manufacture this table in two sizes. The larger or No. 1 shown in cut, is intended for cutting Roman, Norman or Pompeiian brick. It will cut anything up to 14 inches long.

The operation is remarkably simple and as with the case of all of our cutters, the working parts have been reduced to a minimum. The brick are as true and square as those produced on most high priced cutters.

Length of No. 1 Cutter is 5 feet 6 inches, width 4 feet 8 inches. It weighs approximately 1100 pounds.

The No. 2 machine for standard size brick is 5 feet 6 inches long and 4 feet wide. It weighs approximately 1000 lbs.

The Raymond Rotary Holloware Cutter.



IN THIS CUTTER we again use our well known rotary principle for cutting clay products, adapting it to the cutting of hollowares of all descriptions.

In construction, the machine is provided with a strong wood sub-base mounted on adjusting screws in order that it may be raised or lowered to suit the various sizes of holloware. The base is of structural steel of the necessary strength and durability. The end frames are of cast gray iron, and the reel is constructed of two wrought steel rings held in position by the rods and stretchers and the steel bars which form the supports of the outside wire fasteners. The rims are machined to true circles and so securely held in position that one cannot travel faster than the other, thereby giving the reel the ease of movement so necessary in a hand machine.

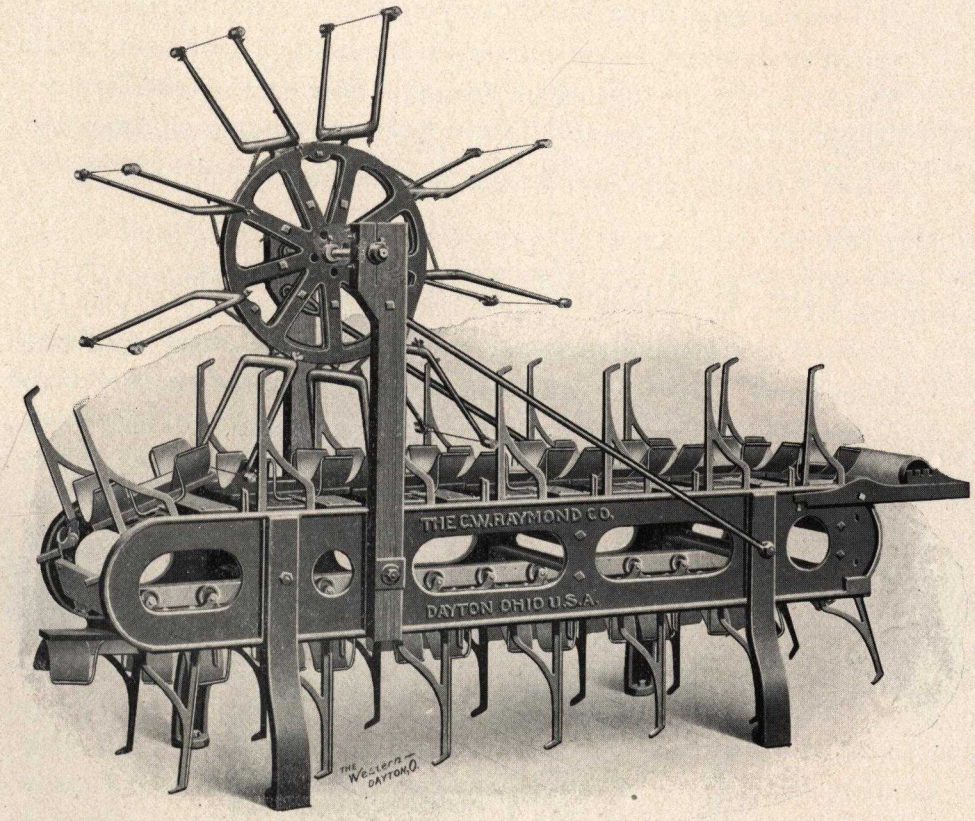
The cutting mechanism moves with the bar and is returned to the starting point by means of a foot lever controlled by the operator. This cut is straight and clear. The machine has but few working parts thereby reducing repairs to a minimum.

The reel is constructed in different lengths to suit conditions. The largest column which can be handled is 13 inches high by 14 inches wide.

The machine can be furnished with a semi-automatic dumping attachment or off-carrying table.

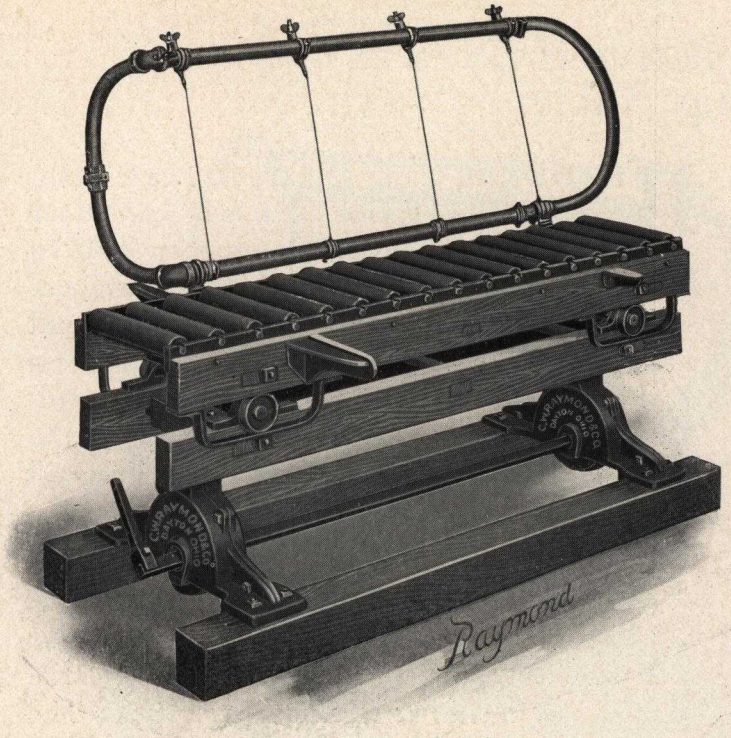
The standard cutter is 7 feet 6 inches long, 5 feet 9 inches wide and 6 feet 10 inches high. Its approximate weight is 1800 lbs.

Automatic Tile Cutting Table.



BY THE USE of our Automatic Tile Cutting Table, the expense of a man to cut off is saved and there are no stub ends to throw back into the machine. It is strong, accurate and durable, absolutely automatic, and will save its cost in a season's run. The success of this machine has been great since its introduction some years ago. The table will operate successfully with any of our auger machines and its capacity is practically limited only to the amount of material furnished it.

It is built of iron and steel and sets close to the machine, thus supporting the column as soon as it leaves the die. It cuts any size tile from 2 to 8 inches in diameter inclusive. The carrier can be adjusted in five minutes to make a different size tile, and the table can also be furnished with flat carriers to cut hollow blocks. All ends are cut absolutely square. No long guide arms are used and no ground pit is necessary. The operation of this table is guaranteed. It is shipped set up ready to operate. Floor space 2 feet 3 inches wide by 9 feet long. Approximate weight 775 pounds.

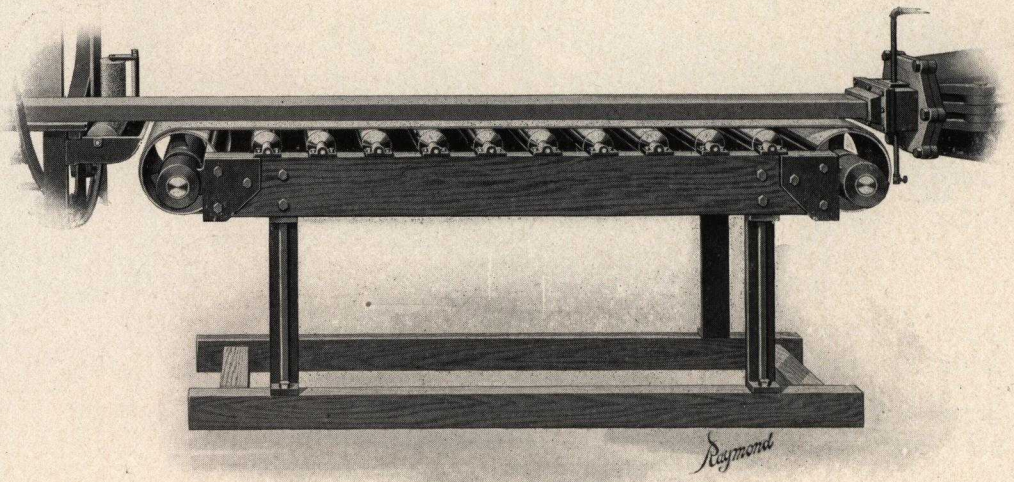


The Raymond Combination Cutting Table

This table is the simplest form of cutter made. It is intended for cutting end cut brick, tile and various classes of holloware. Is can be used with either a single or double stream die and with a separating or off carrying belt if required and can be raised or lowered to accommodate the kind of ware being made. The wires can be spaced as desired. For cutting tile, grooved rollers can be furnished. It is 6 feet long, 2 feet 4 inches wide 3 feet 3 inches high and weighs approximately 500 pounds.

The Raymond Holloware Trimmer.

We manufacture a convenient and substantial appliance to cut odd sizes and angles so often required in holloware work. It is adjustable and will take in any practical size block.



The Raymond Resistance Table.

In many cases the hand cutter does not offer sufficient resistance to the column resulting a tendency toward breakage. To overcome this it is often advisable to insert a resistance table which sufficiently increases the fiction as to overcome that tendency.

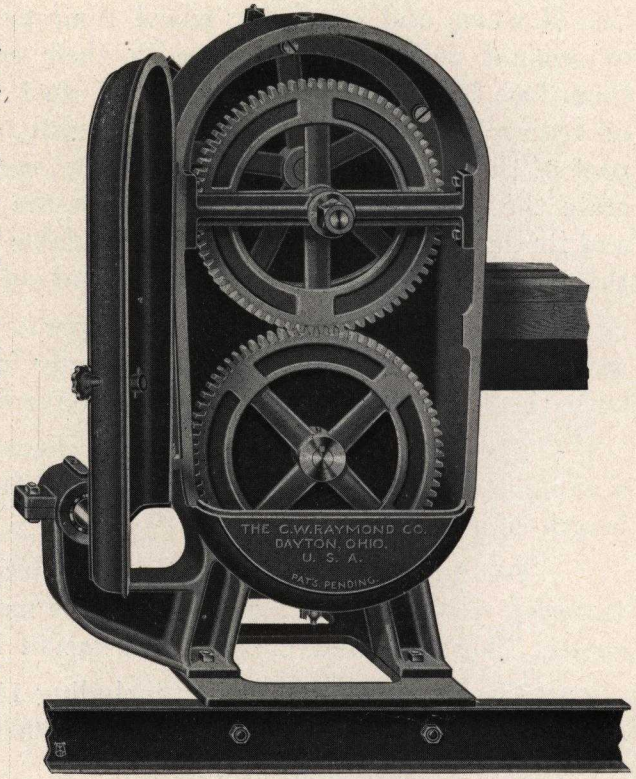
The Raymond Automatic End Cutting Table.

IN SOME localities clays of an extremely plastic nature are found and used in the manufacture of stiff mud common brick, and it has been found in these, that better results are sometimes obtained by the use of the End Cut Die because of the small sectional area of the clay bar being more nearly affected equally by the friction on the sides of the die.

In order to meet this condition, that is, the manufacture of end cut brick, numerous cutting tables were designed, automatic in their mechanical features but universally light in construction and easy to get out of order, causing great inconvenience, loss of time and maintenance expense.

Realizing that the overcoming of these difficulties was very important in the domain of this class of machinery, we were somewhat hesitant in rushing into the matter, however by giving the matter more thought and time, we have been able to design, construct and perfect a machine eliminating the objectionable features heretofore found and also improve the mechanical construction. Simplicity is the keynote of its build, getting away from cam gears and cams, allowing the use of parts which are mechanically correct and not a matter of experiment or guess-work, greatly reducing the amount of power required in its operation and, to repeat, with a minimum of maintenance expense or cost of up-keep.

In some brick factories, where several different size brick are required to be made, necessitating a change in the length of the cut to take care of this contingency, we have so designed the machine that this change can be made in a few moments time without alteration of the adjustment or the purchase of expensive mechanism, which latter not only occasions an extensive financial outlay, but often entails a loss of time when every minute means money, which with the Raymond Automatic Cutting Table is unnecessary.



Operating Mechanism.

THE Raymond Automatic End Cutter has fully demonstrated its ability to operate successfully and continuously at the rate of 150,000 to 250,000 brick per day without stopping for repairs or alterations.

Theoretically, the capacity of this cutter is unlimited, practically, the tests have proven it to exceed that of the largest brick making machine, as by this machine alone was the output limited. To the brickmaker who requires a machine of this magnitude and who appreciates the economy of large capacity, we recommend our Automatic End Cutter.

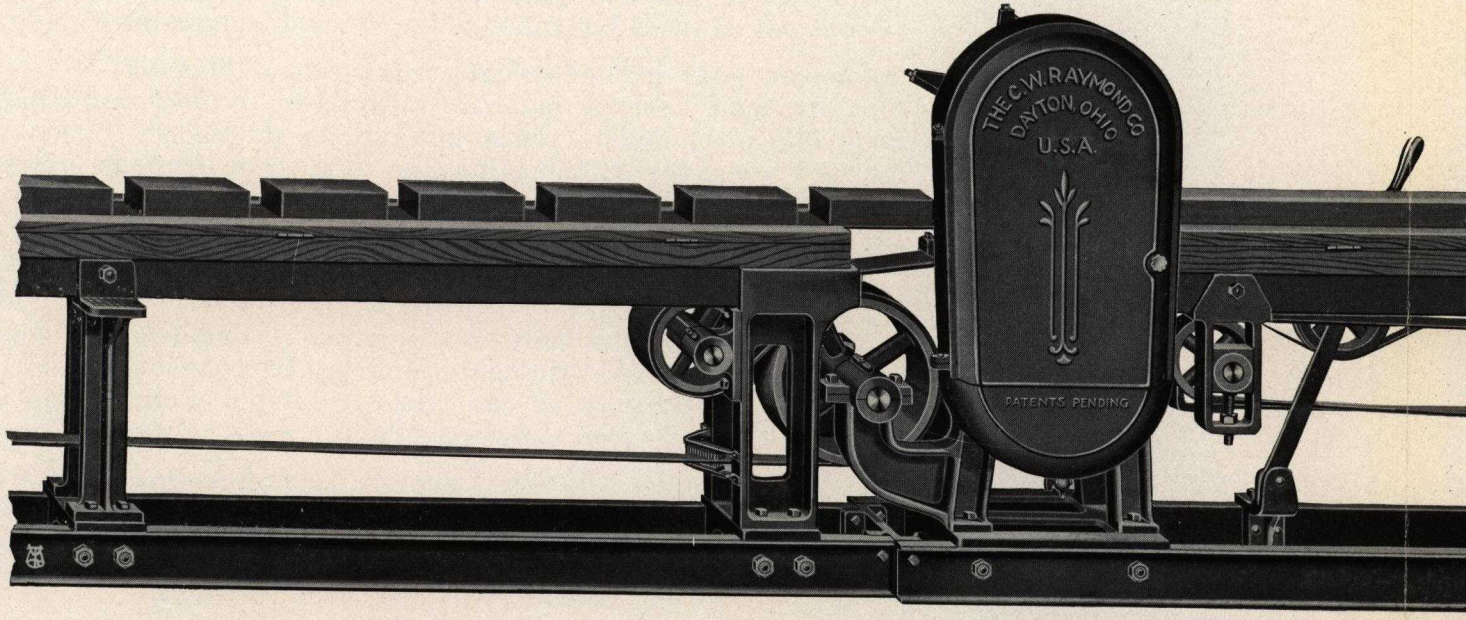
Constructed as it is upon channel iron skids, no vibration is preceptible, no foundation other than these necessary. It is essentially self contained. The operating gears, which control the cutting parts, are cut steel, two of which and one roller wheel comprise the entire operating mechanism. The movements of these parts are of original design and positive in their action. These two gears operate in an encased housing which makes them free from the contamination of dust and dirt. The lower section of this casing is permanent and forms an oil reservoir in which the gears operate, providing continuous lubrication to all working parts. The upper part of the housing is hinged to allow easy access to the operating machinery. Means are provided to accelerate the speed when required, but on the whole the cutter is controlled by the movement of the column of clay and its daily work is not only commendable from a point of speed, but the straight, clean end cut is superior to that of the best selected examples of end cutter work on the market.

An inexperienced laborer can operate and understand the machine owing to the simplicity of its very few working parts, these parts being centrally located and at all times easily accessible so that adjustment can be made with the least possible effort and inconvenience.

The length of the brick can be changed by the substitution of only a measuring pulley of different diameter, a vantage that does not appear on other cutters. The machinery and adjustment is not disturbed by changing the length of the cut.

We might mention also the advantage of our improved method by which the wires are cleared of adhering material, ready for a clean cut on the next brick. These as well as other points of superiority are found in this cutter. Absolute and correct registration is obtained, no matter at what capacity the cutter is operated.

The length of the cutter, including 15 feet of carrier section is 26 feet 7 inches. Width 2 feet 4 inches. Height 4 feet 4 inches. Approximate weight, 2000 lbs.



The Raymond Auto

A Magnificent Example of C

Daily Capacity, up to two hun

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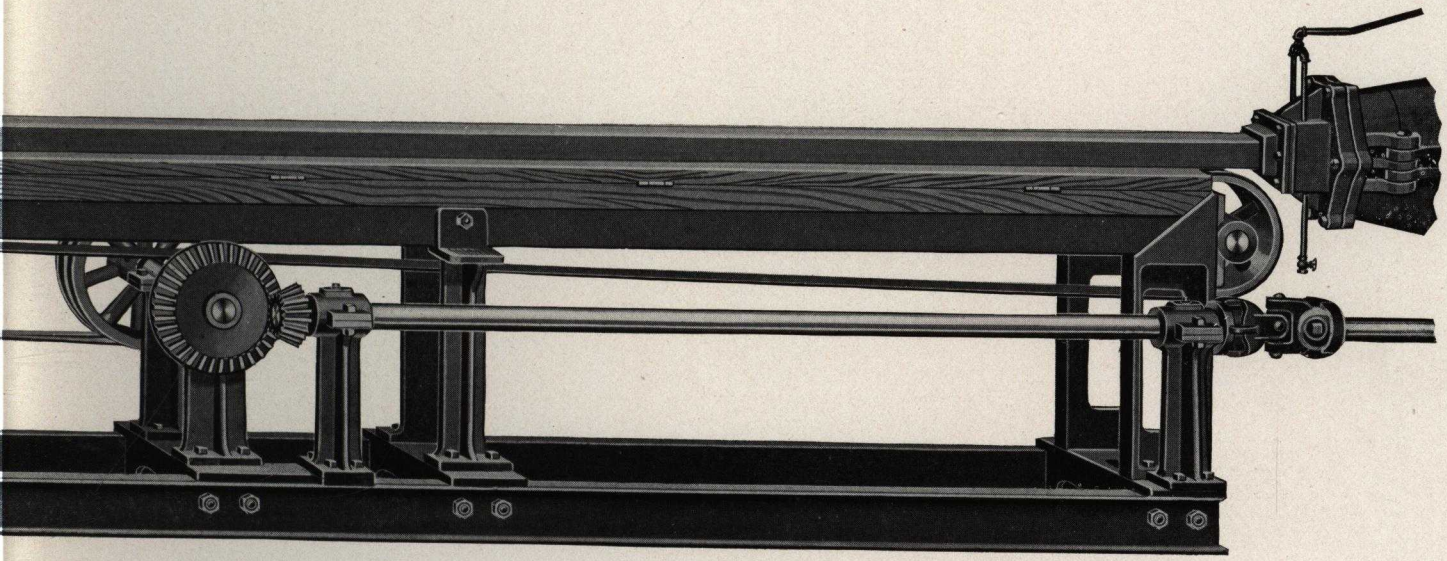

omatic End Cutter.

Cutting Table Engineering.
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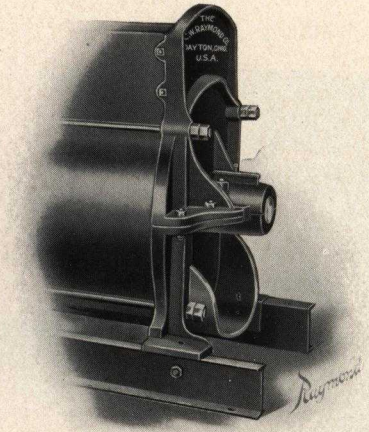
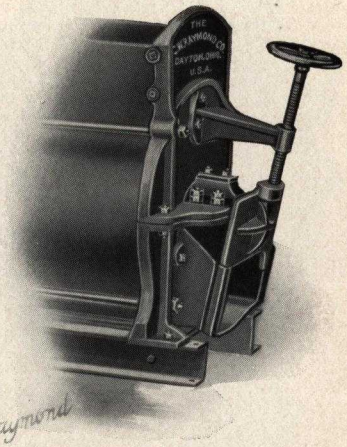
Raymond Pug Mills.



Standard Discharge.

THE PUG MILL is designed for mixing or tempering clay, preparing it for the further process of the Brick Machine. The design and construction, combined with the good material and splendid workmanship included in all of our Pug Mills, cannot but favorably commend them to the trade.

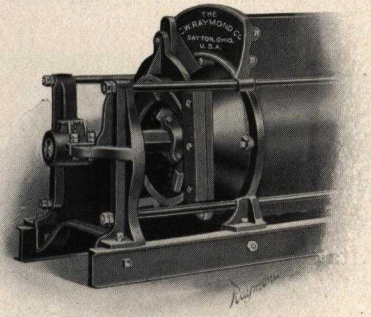
We build an absolutely complete line of these machines, adapting them to all kinds of clay and service. They are constructed exclusively of iron and steel. They are built upon solid channel steel skids extending to the out-board bearing, making them entirely self-contained. The shells are made of 1/4 inch boiler steel. The heads are heavy cast iron, flanged on inner side to fit around shell and are securely held in place by four large rods running through and through. These rods at the same time clamp the shell solidly between them.



Adjustable Discharge.

The blades are attached to the steel shaft by means of individual split interlocking hubs, as shown in cut, the blades being held and the hub clamped to shaft by two bolts. This feature is important, as individual blades can be removed at any time and replaced, either when worn or when a different pitch is desired.

All shafts are of steel with exceptionally long journals. We use an improved type of marine thrust bearing, except in our Heavy Duty Pug Mill where a submerged type is used, which absolutely prevents clay, dust or grit from entering.

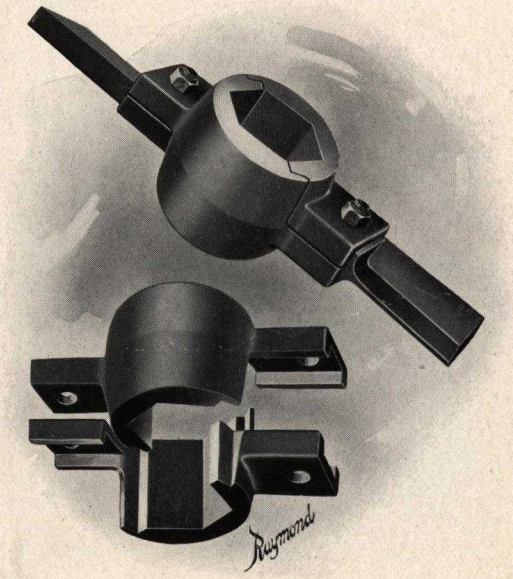


Open End Discharge.

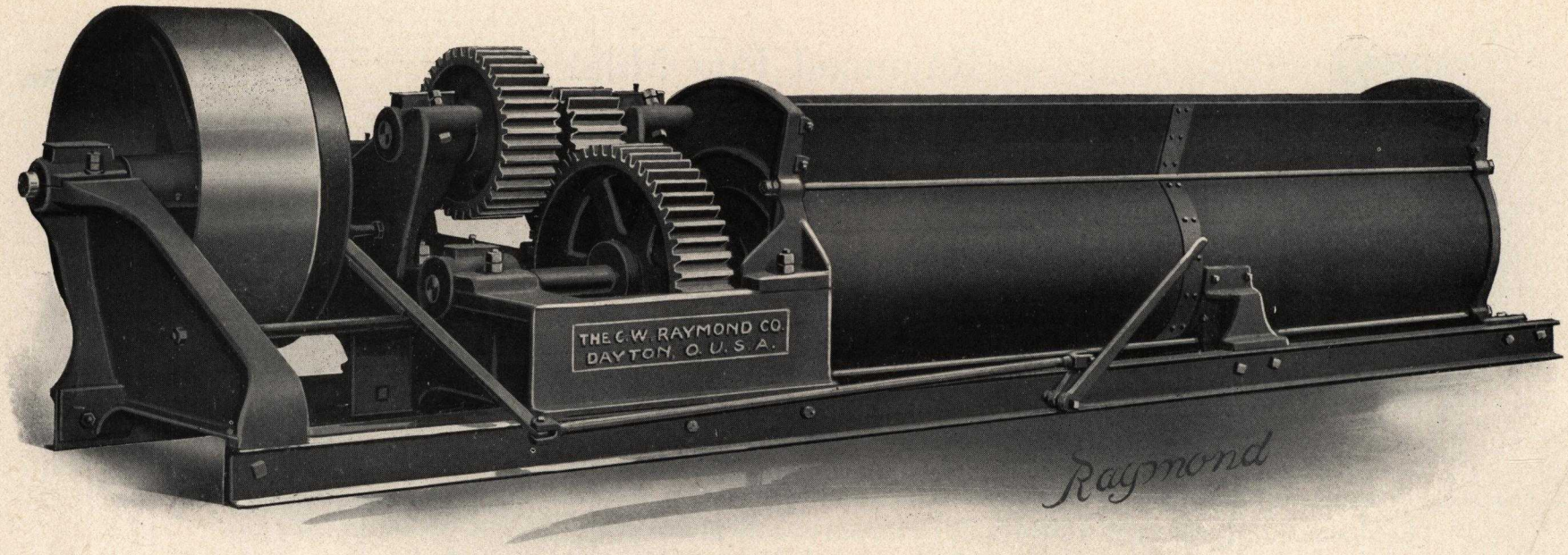
Our Pug Mills are exceptionally strong and will stand the heaviest duty that can be put upon them.

We equip our Pug Mills with any type of discharge that may be desired or required. We illustrate herewith our standard front, our adjustable discharge front and our open end front.

Our mills are equipped with a friction clutch, controlled from a position handy to the operator.



Knives and Hubs.



The Raymond Box Frame Pug Mills.

THESE MACHINES represent the highest ideal in Pug Mill construction. They are as thorough and complete in their make up as our Heavy Duty Mill, but are of different style construction. Like all of our Pug Mills, they are built upon channel steel skids. The main shaft is hexagon hammered steel extended at each end to bearings outside of and apart from the shell. The thrust bearngs is of the marine type and absolutely anti-friction.

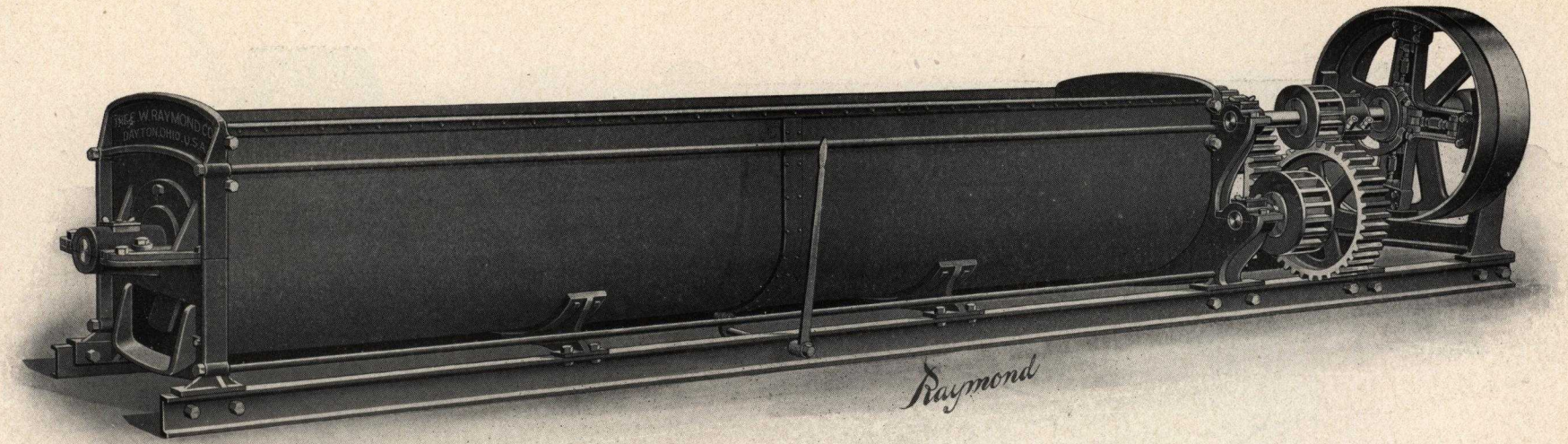
The tempering blades have chilled cutting edges and are attached to the shaft by our split hub. The box frame to which the shaft and shell are attached, is unusually heavy and strong, being calculated with a large factor of safety.

We build these pug mills in three sizes; 10, 12 and 14 feet, all 30 inches in diameter, with capacities of from 40,000 to 100,000 standard size brick per 10 hours.

The 10 foot Mill is 20 feet long, 5 feet 11 inch wide and the height to top of shell is 4 feet 2 inches. Its approximate weight is 8,600 pounds.

The 12 foot Mill is 22 feet long, 5 feet 11 inch wide and the height to top of shell is 4 feet 2 inches. Its approximate weight is 9,500 pounds.

The 14 foot Mill is 24 feet long, 5 feet 11 inch wide, and the height to top of shell is 4 feet 2 inches. Its approximate weight is 12,000 pounds.



The Raymond Heavy Duty Pug Mills.

THE GREAT DEMAND for high capacity machines has caused us to design and construct these splendid Pug Mills to work with our immense brick machines and cutting tables.

They indeed represent the highest attainment in Pug Mill construction, being as thorough and complete in their makeup as the best engineering and mechanical skill can make them. They are self contained, being built on channel steel skids. The head castings and gear frames are of extraordinarily heavy pattern. The journal bearings are of great length and the caps covering the journals are machine fitted to their seats, taking away all shearing strain from the bolts.

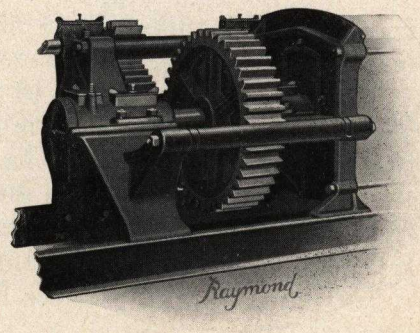
The driving shaft is $2\frac{15}{16}$ inches diameter with an intermediate shaft $3\frac{15}{16}$ inches diameter. The hexagonal steel main shaft is 5 inches diameter , turned to $4\frac{15}{16}$ inches for journals. The thrust bearings is of the submerged type and of immense proportions. The gears are large and strong, the pinions being made of cast crucible steel.

The pugging chamber is U shaped and 32 inches diameter. These mills are made in two sizes 14 and 16 foot. The capacity is from 100,000 to 150,000 per ten hours.

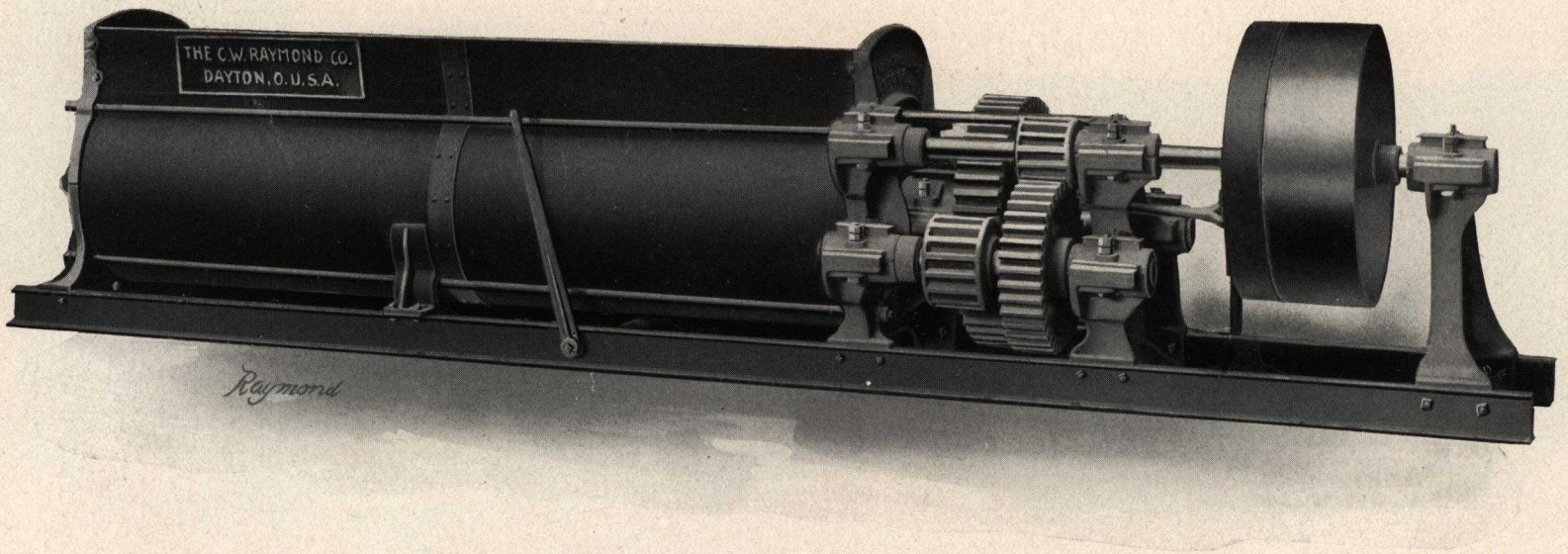
14 foot Mill, length over all 23 feet, width 5 feet 9 inches height 5 feet 1 inch. Approximate weight 12,000 pounds.

16 foot Mill, length over all 25 feet, width 5 feet 9 inches, height 5 feet 1 inch. Approximate weight 15,000 pounds.

The friction clutch pulley is 48 inches in diameter by 14 inches face and should run from 250 to 270 R. P. M.



Showing the Gear Frame and Gears.



The Raymond Standard Pug Mills.

THESE PUG MILLS are recommended for all general pugging purposes. They are built with all the skill and precision possible and are constructed on channel steel skids and steel shafts are used throughout. The thrust bearing is of the marine type and is entirely apart from the shell.

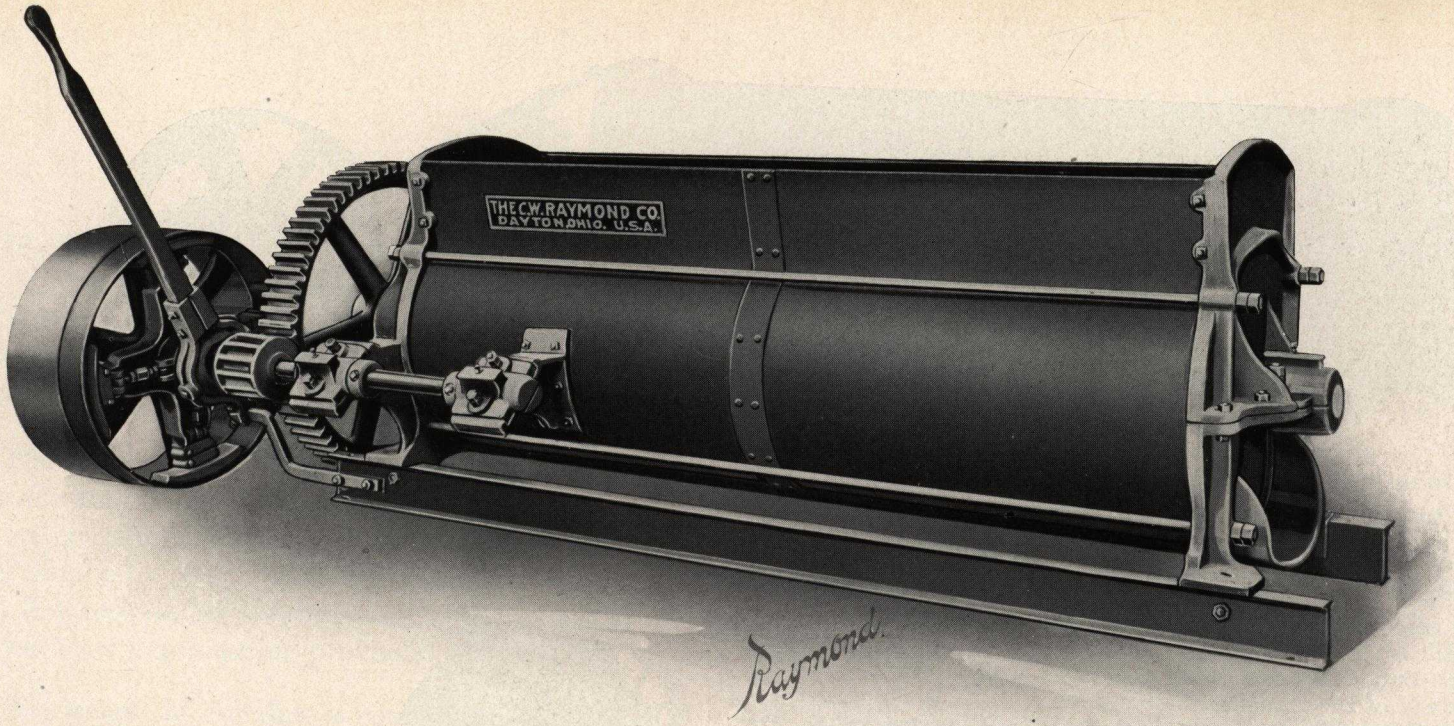
They will handle any class of clay and are very strong and heavy, a large margin of surplus strength and weight entering into their make-up, so that they will easily stand the most rigorous duty that can be imposed upon them.

The 9 foot Mill is 17 feet long, 3 feet 8 inches wide and the height to top of shell is 3 feet 9 inches. The friction clutch pulley is 34 inches diameter by 10 inches face and should be run at from 150 to 200 revolutions per minute. The approximate weight is 6,300 pounds.

The 10 foot Mill is 18 feet long, 3 feet 8 inches wide and the height to the top of the shell is 3 feet 9 inches. The friction clutch pulley is 42 inches in diameter by 12 inches face and should run at a speed of from 150 to 200 revolutions per minute. The approximate weight is 7,500 pounds.

The 12 foot Mill is 20 feet long, 3 feet 8 inches wide and the height to top of shell is 3 feet 9 inches. The friction clutch pulley is 42 inches in diameter by 12 inches face, and should run at a speed of from 150 to 200 revolutions per minute. The approximate weight is 8,600 pounds.

The capacity of these Mills is from 30,000 to 100,000 per 10 hours.



The Raymond Single Geared Pug Mills.

WE BUILD these mills in 8 foot, 9 foot and 10 foot lengths, all 30 inches in diameter. In construction and material they are identical with our other mills, except that they have single gears. They have all the main points of merit found in the other types, such as steel shafts throughout, improved split independent hubs for each knife, flanged heads and extra long bearings.

The strenuous work of the gearing in these machines has been given full consideration and the gears which we provide have been calculated with a wide margin of safety, in order that they will stand the strain to which they are continually subjected.

The capacity of these mills is from 10,000 to 50,000 standard size brick per 10 hours.

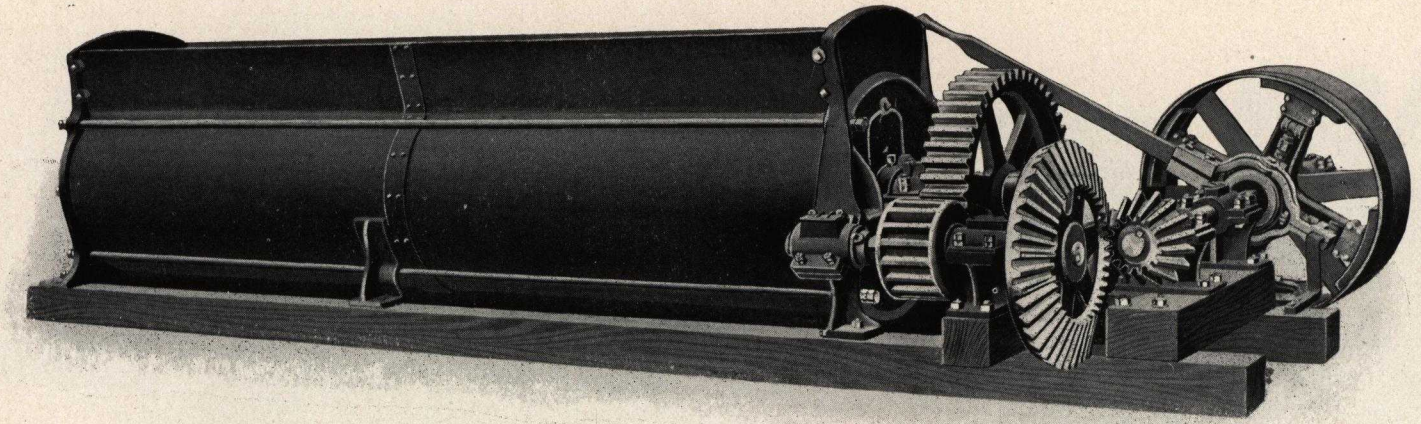
SPECIFICATIONS.

No. 4 Single Geared Pug Mill—Length 10 feet 5 inches, height to top of shell 2 feet 11 inches, width 4 feet 1 inches. Friction clutch pulley 34 inches diameter by 8 inches face. Speed 150 to 200 R. P. M.

8 foot Single Geared Pug Mill—Length 13 feet 7 inches, height to top of shell 3 feet 7 inches, width 5 feet 4 inches. Friction clutch pulley 34 inches diameter by 10 inches face. Speed 150 to 200 R. P. M.

9 Foot Single Geared Pug Mill—Length 14 feet 7 inches, height to top of shell 3 feet 7 inches, width 5 feet 4 inches. Friction clutch pulley 34 inches diameter by 10 inches face. Speed 150 to 200 R. P. M.

10 Foot Single Geared Pug Mill—Length 15 feet 7 inches, height to top of shell 3 feet 7 inches, width 5 feet 4 inches. Friction clutch pulley 42 inches diameter by 10 inches face. Speed 150 to 200 R. P. M.



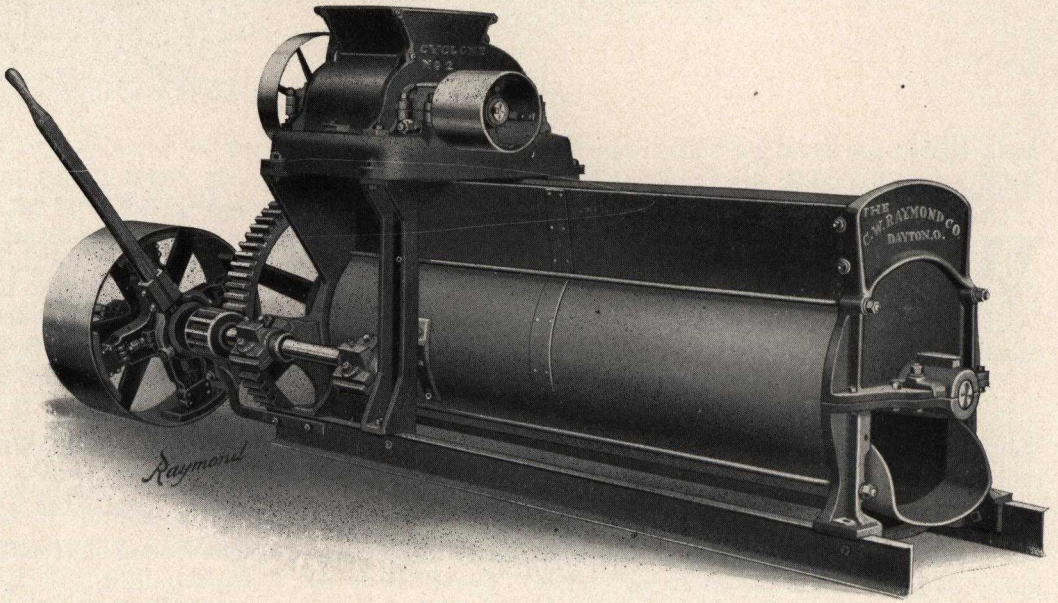
The Raymond Bevel Geared Pug Mill.

THE construction of the Bevel Geared Pug Mill is similar to that of our other mills, the only difference being the bevel gear drive instead of the standard double gear.

We build this type of pug mill to order in 9, 10 and 12 foot lengths.

The approximate weight of the 9 foot mill is 5500 lbs., of the 10 foot mill 6700 pounds, of the 12 foot mill 8000 pounds.

All of these Pug Mills are equipped with a four arm type friction clutch pulley, 42 inches in diameter by 12 inches face which should be run from 150 to 200 revolutions per minute.



The Raymond Combined Disintegrator and Pug Mill.

A COMBINATION of two Standard Machines embodying many features of interest to the brickmaker. This construction requires the building of only one platform to accommodate the two appliances.

Our No. 20 Disintegrator can be so attached to either of our 9 foot or 10 foot Pug Mills.

Raymond Represses.

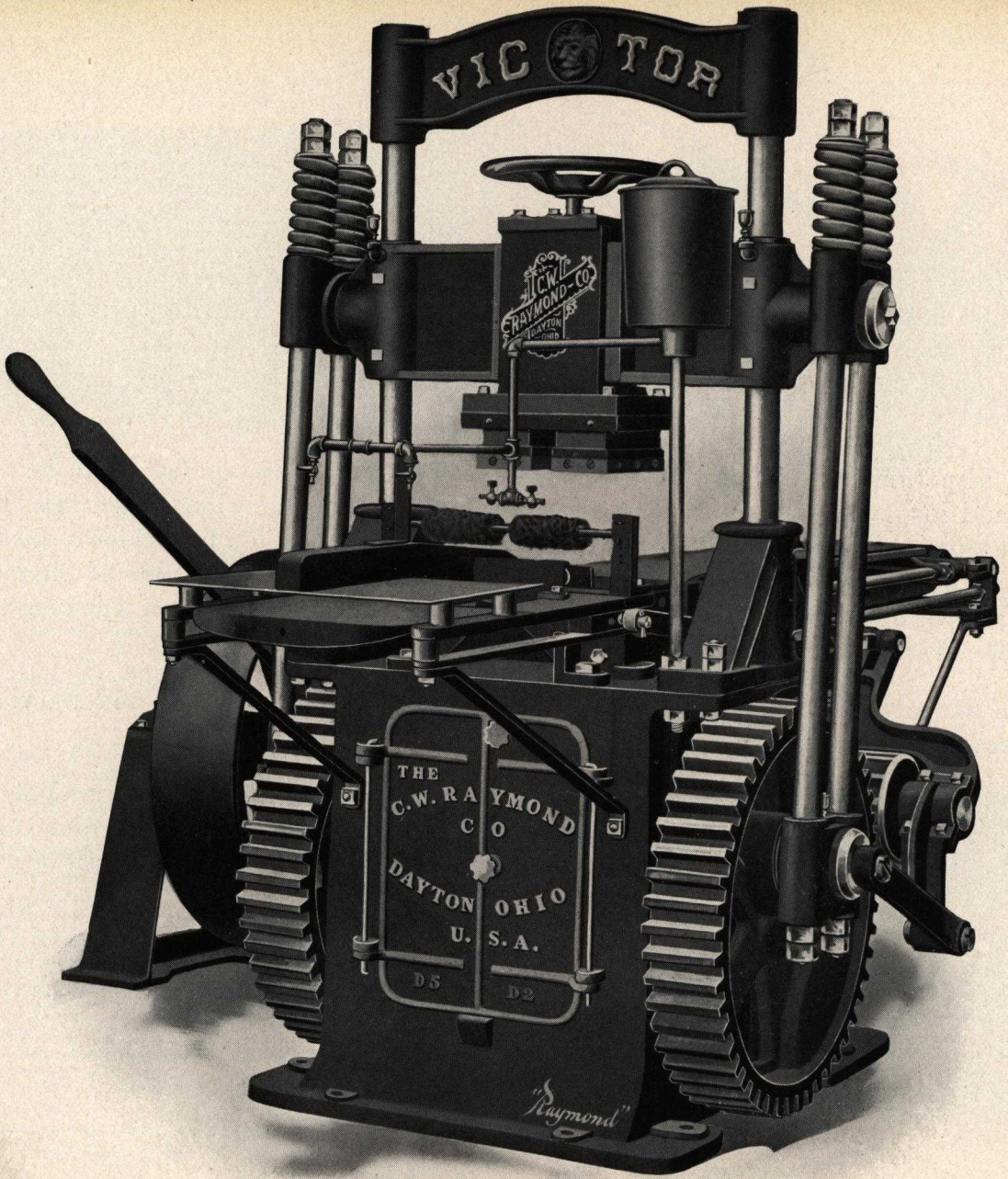
THE FIRST successful power repress ever put before the public was a Raymond. We were also the original inventors of an Automatic Feed and Delivery for power represses. Having had such a start in this particular line of clay working machinery, it is not surprising that we have always kept a distinct lead. In our wide experience we have always designed and manufactured machines for pressing every conceivable form of plastic material.

The series of Hand and Power Represses which we have put upon the market, have been constructed with a view to durability and longevity under the hard and continuous service to which this class of machinery is subjected. Represses are generally so related to the balance of the plant that if a break-down occurs to them the entire plant is stopped. With this idea in mind, we have constructed represses that are so simple mechanically, and have so few moving or wearing parts that it is practically impossible for them to get out of order. Where wearing occurs we have made ample provision for taking it up in a few moments.

The weight of our dies is counter balanced, making very little power necessary and allowing the presses to run at a remarkable speed. The efficiency of the operator alone limits the capacity.

Our Patented Automatic Feed and Delivery used on the Power Presses is convenient to operate, positive in its action and capable of rapid and minute adjustment to different sized dies. The dies can be easily changed and others substituted thus making our Represses universal in their adaptability to all kinds of work.

The construction of these presses, as in the case of all Raymond Machinery, is up to the highest standard of engineering and mechanical excellence. That they possess more power, have greater capacity, have a lower cost of up-keep and make finer ware is an assertion that can be certified to by hundreds of satisfied users.



The Raymond Victor Repress.

The Raymond Victor Repress.

IN THIS machine, we present the last word in Power Represses. It is indeed a "Victor" in every respect. In the sixteen years since the press was first placed on the market, hundreds have been installed and we have yet to hear of one word of dissatisfaction.

Simplicity of construction has been the watchword in this machine, only two shafts being used. A solid iron base encloses all working parts, keeping them free from clay and dirt. This base not only gives solidity to the entire machine, but takes the pressure of the brick instead of allowing it to be thrown onto a moving cam or shaft.

It is adjustable instantly to any thickness of brick without "shimming". The pressure is regulated by a turn of the hand wheel on top.

Dies of various shapes and sizes can be used and these can be changed in a few moments.

Width over all 6 feet 8 inches. Length 8 feet 3 inches. Height 7 feet 1 inch. Height to top of feed table 37 inches. Solid iron base is 34 inches wide and 39 inches long. Approximate weight 7,500 pounds. Friction Clutch Pulley, 34 inches in diameter by 8 inches face and should run 60 to 80 R. P. M. Maximum single die about 14x18x5 inches. Maximum double die about 6½x18x5 inches. Capacity with double die, 20,000 to 28,000 standard size brick per 10 hours.

No. 1. No. 2. No. 3.

The Perfection Hand Represses.

The Raymond Perfection Hand Represses.

THESE well known and popular hand represses are made in four sizes, known as Nos. 1, 2 and 3 and No. 3 Special. The No. 3 Special differs from the others in that it has double levers, being used for pressing very heavy blocks, coping and special work of a heavy nature.

These represses have proved themselves capable of handling any kind of pressed work with perfect satisfaction. The dies can be readily changed for various shapes and sizes, and the pressure and thickness can be instantly regulated by means of the hand wheel on top. This latter is a most important feature and is found only in our presses.

The construction and materials are of the highest class. An enormous pressure is obtained with very little operating power by means of the system of toggle and lever movements used.

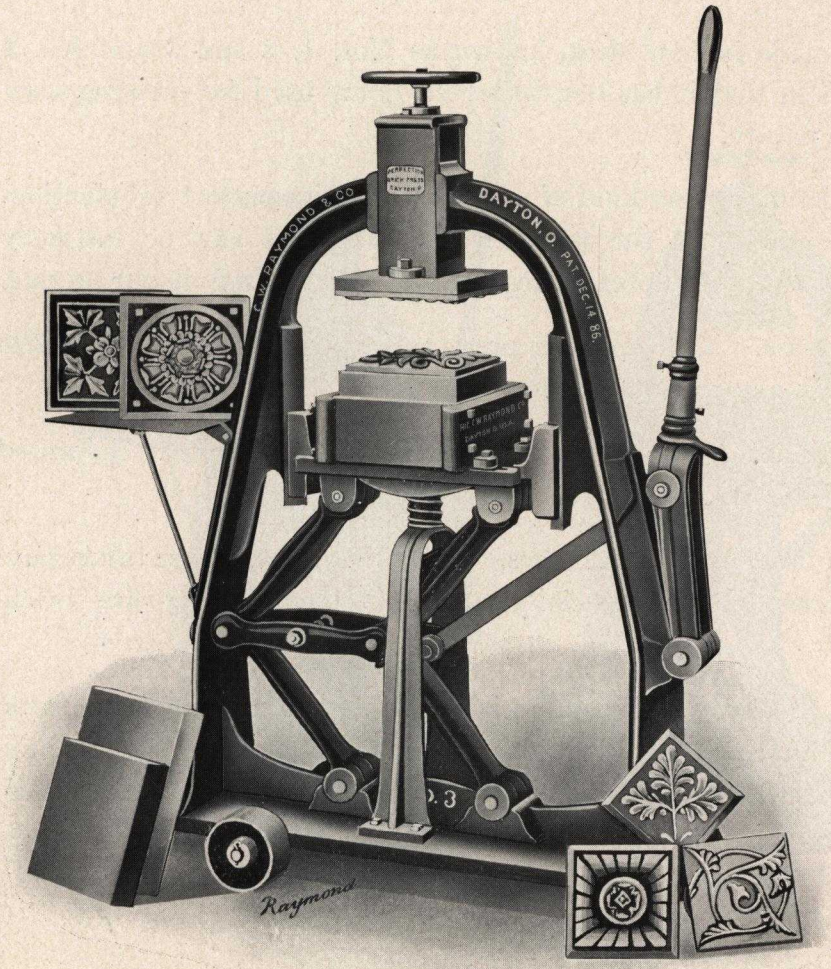
The No. 1 Repress is used principally for building brick. It will work a die as large as 9 x 9 inches. A limited amount of ornamental work can be done on this press. Approximate weight, 800 pounds.

The No. 2 Repress is larger and will work a die as large as 11 x 11 inches. For building brick, fire brick, paving blocks, floor tile, etc., it is probably the best of the series. It is especially adapted to repressing fire brick. Approximate weight 900 pounds.

The No. 3 Repress will work a die as large as 14 x 18 inches. It is especially adapted to making ornamental brick or blocks of large sizes. We have also adapted this machine, by slight changes in construction, to the manufacture of roofing tile and dry press brick. Its use in these lines is described elsewhere in this catalog. Approximate weight 1850 pounds.

The Raymond No. 3 Perfection Brick Repress

For Ornamental Work.



FOR pressing large tile, paving blocks, ornamental work, etc., it has great power and an almost unlimited range. Dies as large as 18 by 14 by 5 inches and any size smaller can be worked upon it. Its manner of making ornamental work and terra cotta is as follows:

The clay is first struck out by a machine or molded by hand, in order to get the requisite amount in the block and shape it for convenient handling. After allowing it to partly dry, it is put under pressure as indicated. With one motion of its powerful lever the most elaborate and costly designs are produced, automatically removed from the die, and ready for the work of the off-bearer. As many as 2,000 of these finished blocks have been made in ten hours on one repress.

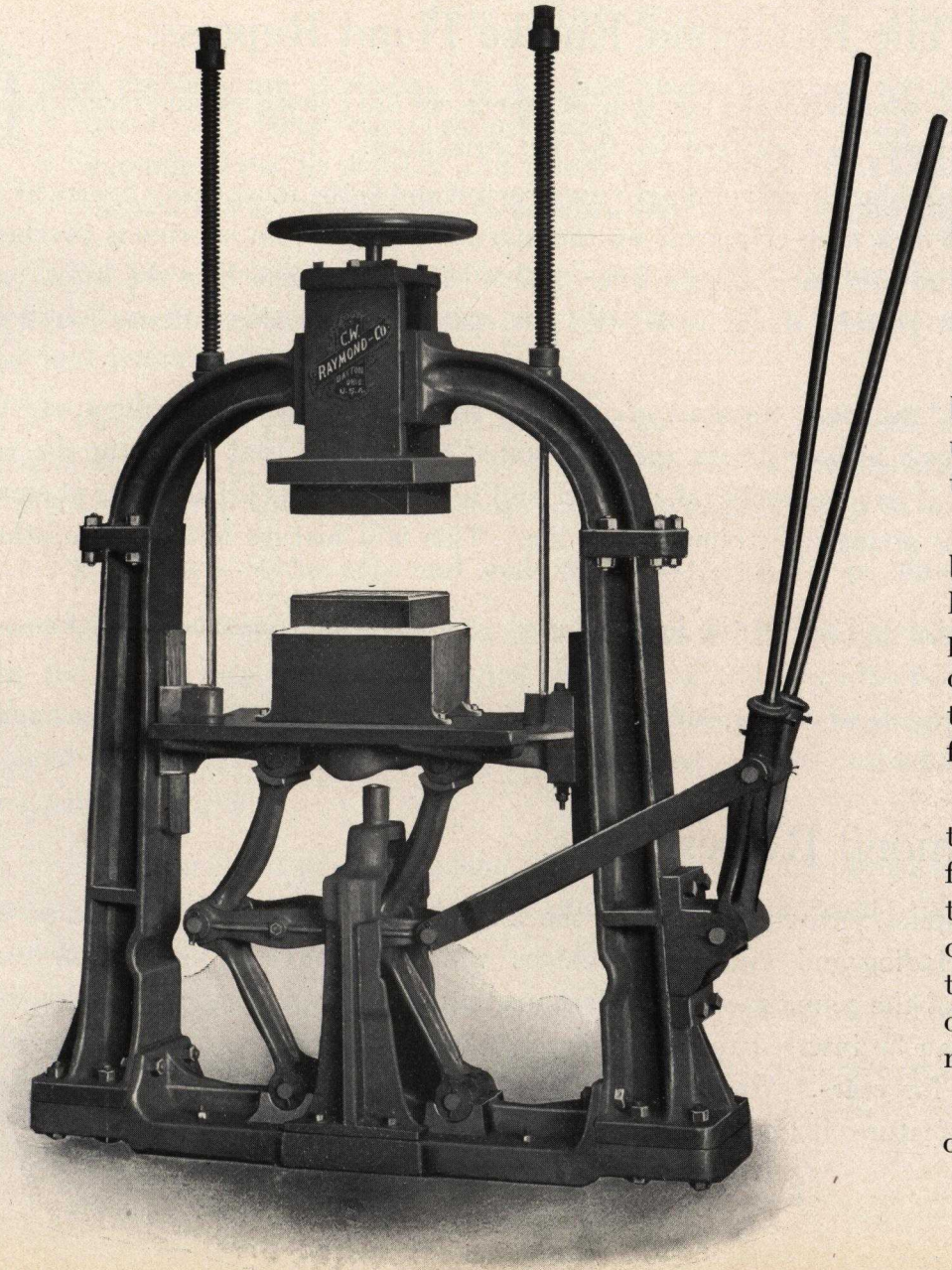
The embellished plates shown in the engraving can be used upon each die in endless variety. They are made usually in brass, from designs submitted by the purchaser, or furnished by the manufacturers of the repress.

By the great pressure employed each block is given uniformity of size and figure, is thoroughly solidified and its most obscure parts pressed into prominence.

No previous shaping of the brick in a mold is required, and all annoyance of loose plates in the bottom of the die is avoided. The work in progress is always within full view of the operator, and need not be removed from the repress until perfect in shape.

By this arrangement all shapes and designs of ornamental brick can be made at a very small cost for labor and dies.

Weight, 1,800 pounds.



The Raymond No. 3 Special Block Repress.

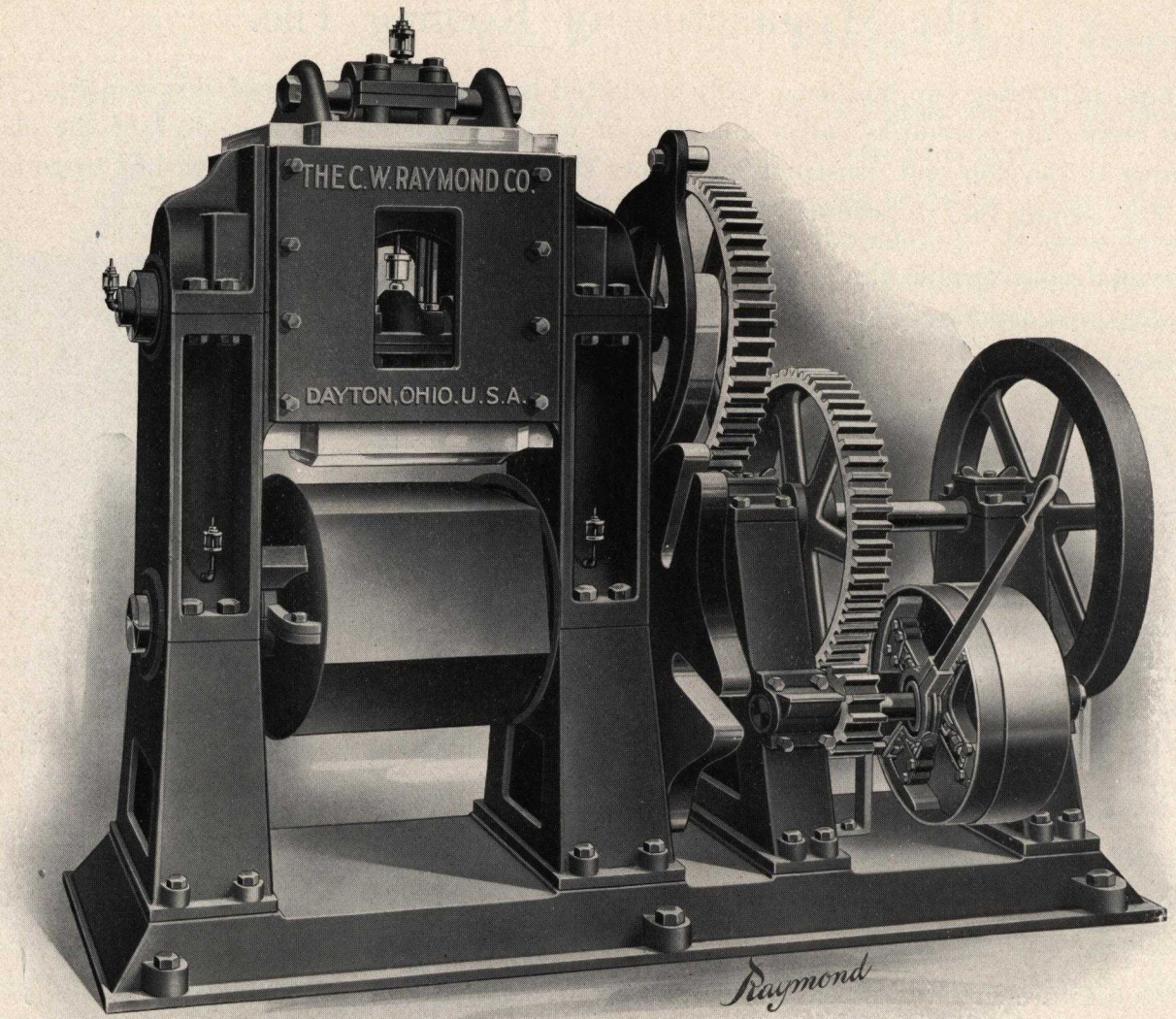
THIS Repress is built especially for the heaviest and most exacting repressing duty. It is especially adapted to the pressing of large fire clay blocks and heavy capings where great pressure is required. The distance between the upper and lower dies admits work of unusual height. The double handles, operated by two persons, gives a most powerful pressure.

The process of pressing is as follows: The block is previously shaped in a brick machine or hand mold and allowed to dry slightly. It is then placed upon the bottom plunger, the handles drawn down and returned to an upright position, the latter movement automatically delivering the finished block to the top of the die for removal.

The construction is extremely heavy and of the highest class. All surfaces are planed and fitted and the bolt holes are drilled and the bolts turned. The toggle joints are 6 inches wide, machine fitted, and 1½ inch steel pins run through them. In fact, it is the most perfect and up-to-date Repress that has ever been put upon the market.

A die as large as 16 x 20 inches x 5 inches thick can be worked on it.

Approximate weight, 4,500 pounds.



The Raymond Roofing Tile Press.

The Raymond Roofing Tile Press.

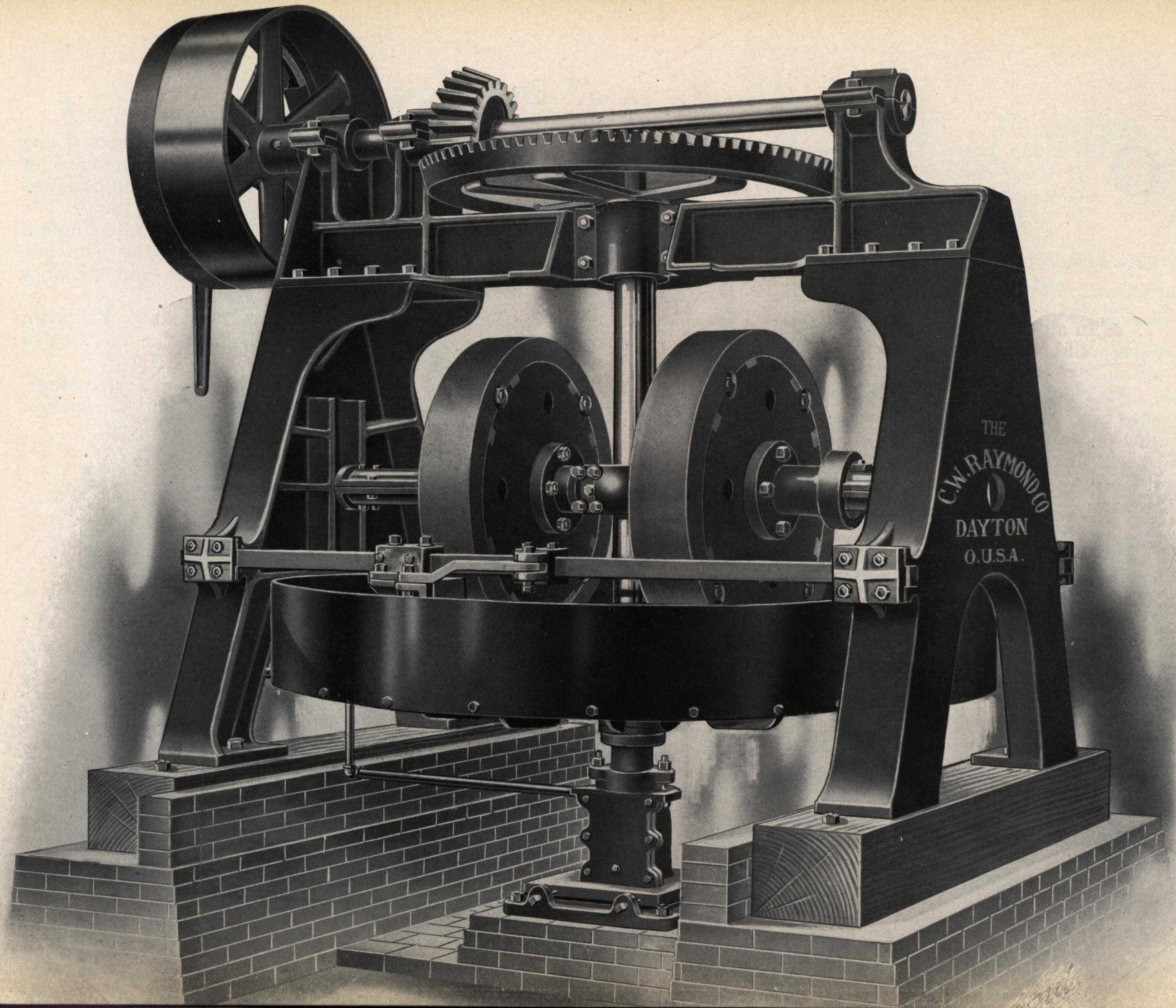
IN THE Raymond Roofing Tile Press, as in all other lines of clayworking machinery, we are giving to the roofing tile manufacturer, the most perfect and powerful machine that has ever been built and one which is proving itself successful under many rigorous conditions and is today making tile to cover the roofs of some of the most magnificent modern buildings and residences, as well as those of less pretentions.

In general construction the very best materials are used throughout while all contacting surfaces are machine fitted, thus insuring a rigidity that is far in excess of less careful construction. Steel shafts are used in the entire machine. It is mounted on a solid cast base supporting the entire mechanism making the press entirely contained within itself allowing it to be set on one rigid foundation, thus keeping it in perfect alignment and eliminating all vibration under the most severe conditions. The side frames are massive, the gearing well proportioned and strong. In fact, every care is taken to insure longevity and a perfect product.

The machine is of the pentagon style and the power is received by a four arm type friction clutch pulley, transmitting it through the gears into the upper plunger which moves vertically in the guides. The pentagon is actuated by an escapement movement so carefully adjusted that it is always in exact register with the movement of the plunger. It is also controlled by a fly wheel, balancing it to a nicety. This pentagon is also cast hollow in order that steam heat can be applied, should it be necessary as in the case of some materials.

The capacity of the Raymond Roofing Tile Press is only limited by the kind of material used and the skill of the operator. From four to ten thousand standard sized tile can be made according to the conditions.

The length is 8 feet 7 inches; width 3 feet 7 inches; height 7 feet 3 inches. It is furnished with a four arm type friction clutch pulley 42 inches in diameter by 8 inches face, which should run at the rate of 110 revolutions per minute. Approximate weight, 15,000 pounds.


THE
C.W. RAYMOND CO
DAYTON
O.U.S.A.

The Raymond Heavy Duty Dry Pan.

WE HEREWITH illustrate our massive Heavy Duty Dry Pan, especially built for reducing hard and very refractory materials. In weight it exceeds that of the heaviest dry pans on the market. Every part is designed so that the full limit of its weight is utilized practically, there being no dead weight merely to make the pan heavy. The entire machine aggregates a grand total of eighteen tons.

The step bearing is that which was designed for this machine and is now used on all of our nine foot dry pans. The main or upright shaft is hammered steel 6½ inches in diameter below the disc plate and 6¼ inches in diameter above it, with a collar over 2 inches in thickness and nearly 9 inches in diameter, forming a shoulder upon which the large disc plate rests.

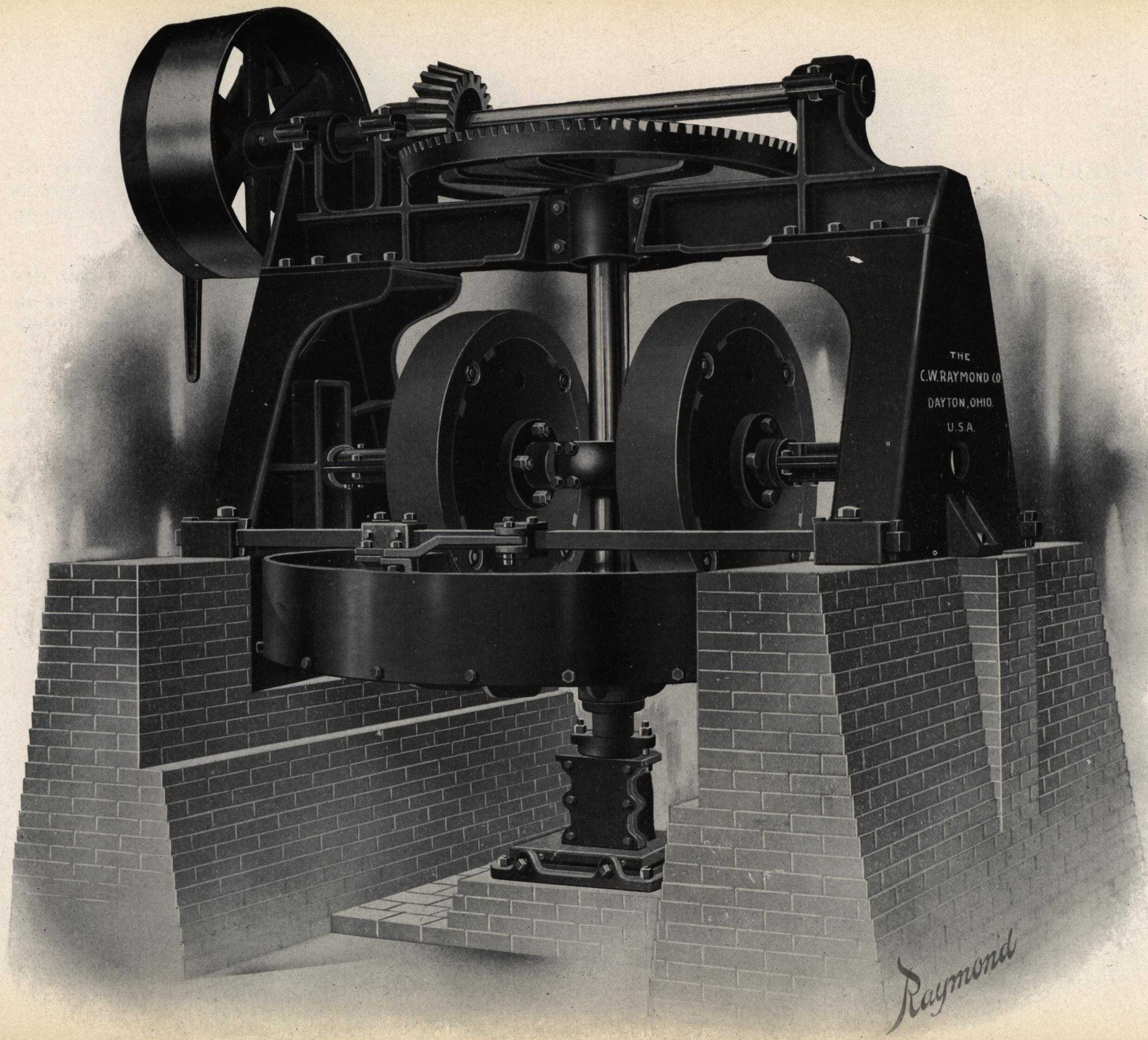
The screen plates are made in various styles with slots running radially, circular or angular. These plates are interchangeable and different styles can be used on the same pan, giving the greatest latitude in controlling the peculiarities of various materials. The screening plates are of hard iron and show 20 per cent. more screening surface than those of ordinary design. This increase in available screening surface is attended by a corresponding increase in capacity.

The mullers are 52 inches in diameter with 10-inch face, although, should it be desired for any reason, lighter mullers can be substituted. They are made of gray iron excepting the tires, which are made of a special mixture, giving hardness equal to any chill, all the way through them. The tires are so attached to the mullers that they can be removed easily and replaced by others, when necessary, and at the same time being held firmly in position. The tracks on which the mullers operate are of hard iron 3½ inches thick, and when worn can be replaced in a short time, and with but little trouble and expense. The full weight of the mullers revolves on these plates crushing the material faster and finer than where a large portion of the muller's weight is suspended by springs.

A great amount of care and attention is bestowed on the minor details in the finishing of this pan and all connecting surfaces are planed, bolt holes being drilled, which in all cases insures perfect alignment and the utmost rigidity. Steel shafting is used throughout, and the driving shaft is fitted with three bearings, adding extra strength and allowing the driving pulley to run in either direction.

We commend this pan to the discriminating buyer as a machine equal to any and all demands that could be made on it. It being of special weight and design it is only built to order.

It is fitted with a four arm type friction clutch pulley, 48 inches in diameter by 14, 16 or 18 inch face, and should run 116 revolutions per minute. Floor space required, 14 feet 6 inches long, 9 feet wide and its height from the bottom of the base plate to the top of the pulley is 12 feet 4 inches. Approximate weight, 36,000 pounds.


THE
C.W.RAYMOND CO
DAYTON, OHIO.
U.S.A.
Raymond

The Raymond Low Frame Dry Pan.

THIS is one of the finest products of the Engineering Department. No work can possibly be imposed on this splendid machine which can give it the least trouble.

The side frames are made low, setting on what is practically always the floor level at the Dry Pan, in good clay works construction. They are of the strong angular design, entirely solid and heavily ribbed. The three foundation bolts in each frame are out of alignment giving the greatest possible stability.

The cross or bridge beam contains three heavy bearings, which allows the beam to be set so as to run the driving shaft in either direction and with the pulley on either side. At the same time, all points of strain are at the bearings. No cumbersome outboard bearing for the pulley is necessary and we can, therefore, place the friction clutch lever on the outside where it belongs, instead of on the inside as in other pans.

The mullers are of extreme weight, over 6 ton, and are arranged to give the maximum amount of grinding surface. We regularly furnish them with a 10 inch face, but wider or narrower ones can be furnished on order.

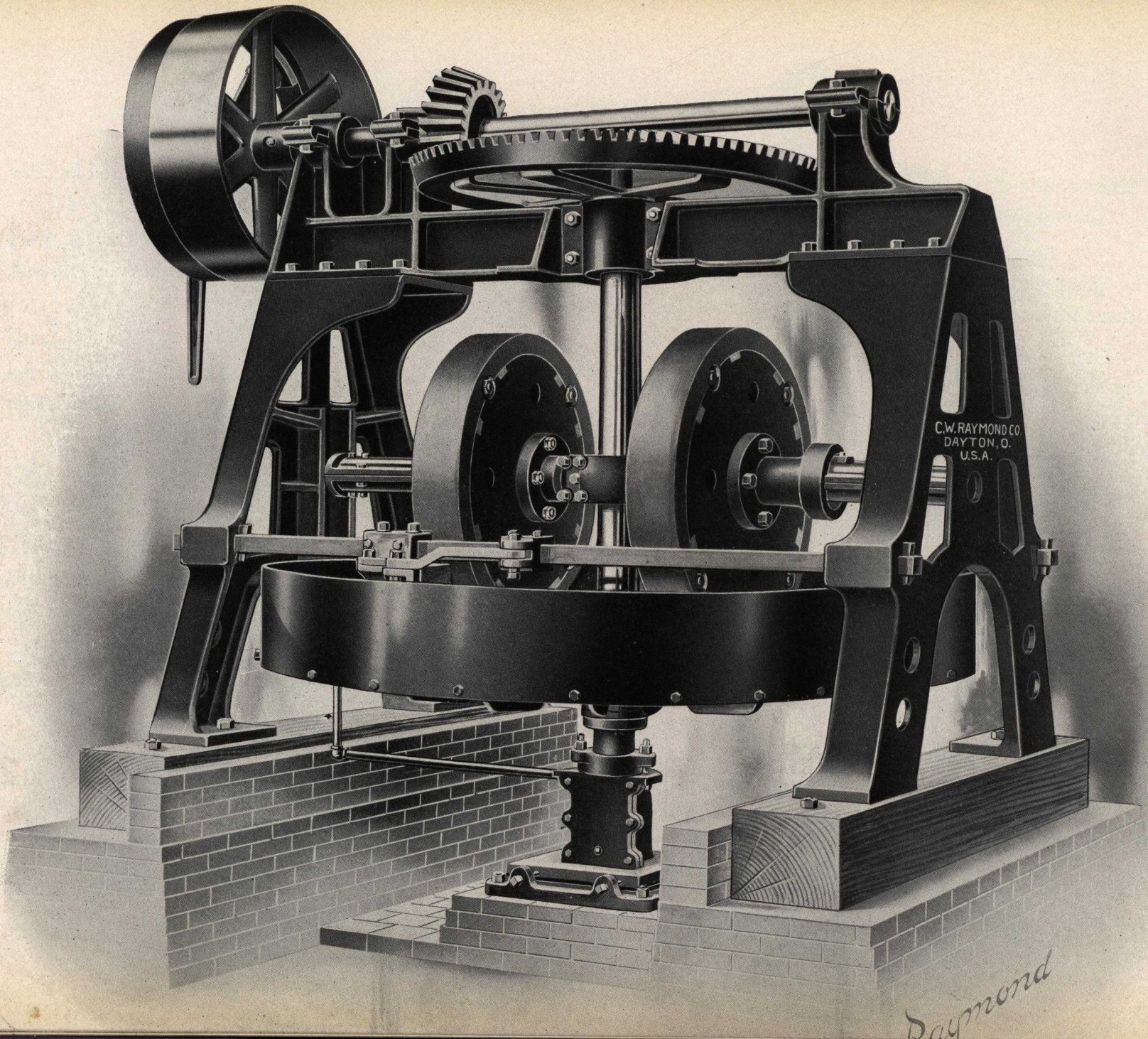
The screen plates are twelve in number, and are supported by twelve arms which are so designed that, should such a contingency occur, they would support themselves in place on the disc even if all of the bolts holding them in place dropped out.

The vertical shaft is of hammered steel and the collar which supports the disc is a forged integral part of it.

The Raymond Step Bearing is used which runs submerged in oil. It will not heat under the most severe conditions.

We especially recommend this pan to be used with a gravity bottom discharge. While the first cost of such a discharge is higher than the old method, the fact that all under scraper costs are eliminated and that a continuous saving from 5 to 8 horsepower is made, makes this suggestion worth consideration.

This pan is fitted with a 48 inch, four arm type friction clutch pulley, having a 16 or 18 inch face. It should run 150 R. P. M. Floor space required: Length 14 feet 6 inches; width 10 feet; height from bottom of base plate to top of pulley, 12 feet 3 inches. Approximate weight, 35,000 pounds.



Raymond

The Raymond Nine Foot Standard Dry Pan.

IN THE many cases wherein a pan of heaviest construction is not required, due to the fact that the material does not present great difficulty in crushing, we have placed on the market our Nine-Foot Standard Dry Pan, which meets every demand for crushing any ordinarily hard materials. It is built from the foundation up thoroughly solid and on the same general plan as our entire nine foot line. The main shaft is 6¼ inches in diameter above the disc and 6½ inches below, with a heavy collar over 2 inches in diameter, which is forged as a part of the shaft and forms a solid shoulder on which to support the disc.

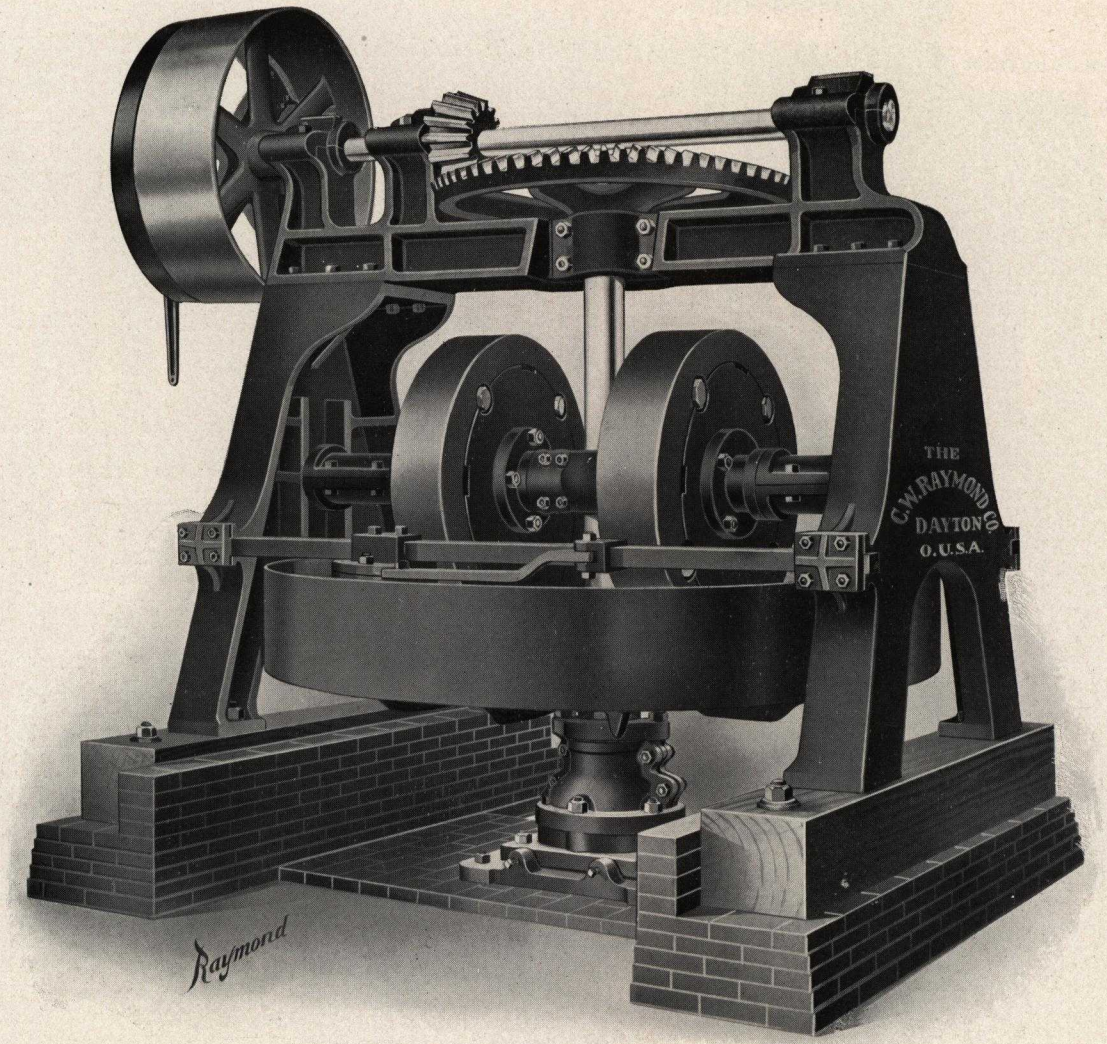
The mullers are 48 inches in diameter with 9 inch faces and are far heavier than any mullers now being used on other pans of this size.

The screening surface is composed of plates of the desired mesh, either with radial, circular or angular slots, these plates being interchangeable and the different styles can be used on the same pan arranging it to suit peculiarities of various materials, giving the best results. The screening plates show actually 20 per cent. increase in screening surface, all of which, with the heavy mullers, makes the pan of greater capacity than by any other construction.

The wearing plates are of hard iron and can be replaced when worn in a short time with little expense and trouble. The full weight of the mullers operate on these plates giving greater crushing power than when a great percentage of the mullers' weight is suspended by springs.

The step bearing is the same design and size as that used on our larger machines and is of the submerged type, many of which have been placed on machines of other makes, and we can, without fear of contradiction, say that since the first trial of this step it has never been known to heat or show undue wear.

Steel shafts are used throughout. The floor space required is 14 feet 9 inches long by 9 feet wide. Its height from the bottom of the base plate to the top of the pulley is 12 feet 1 inch. It is fitted with a four-arm type friction clutch pulley 42 inches in diameter by 14 or 16 inches face, as may be desired. This pulley should run at 116 revolutions per minute. Approximate weight 31,000 pounds.



The Raymond 8, 7 and 5 foot Dry Pans.

The Raymond 8, 7 and 5 Foot Dry Pans.

WE MANUFACTURE the heaviest and most substantial Dry Pans of the lesser sizes, that are being marketed today. They are constructed on the same lines as our splendid 9 foot pans and contain all the salient features that have made Raymond Dry Pans famous the world over.

The side frames are massive and both of the larger sizes have the three bearing cross beam, which allows them to be run in either direction, with a bearing close to the pinion.

The shafting is of steel and is generous in diameter. The main vertical shaft is of hammered steel and the collar upon which the disc rests is an integral part of it.

THE RAYMOND 8 FOOT DRY PAN.

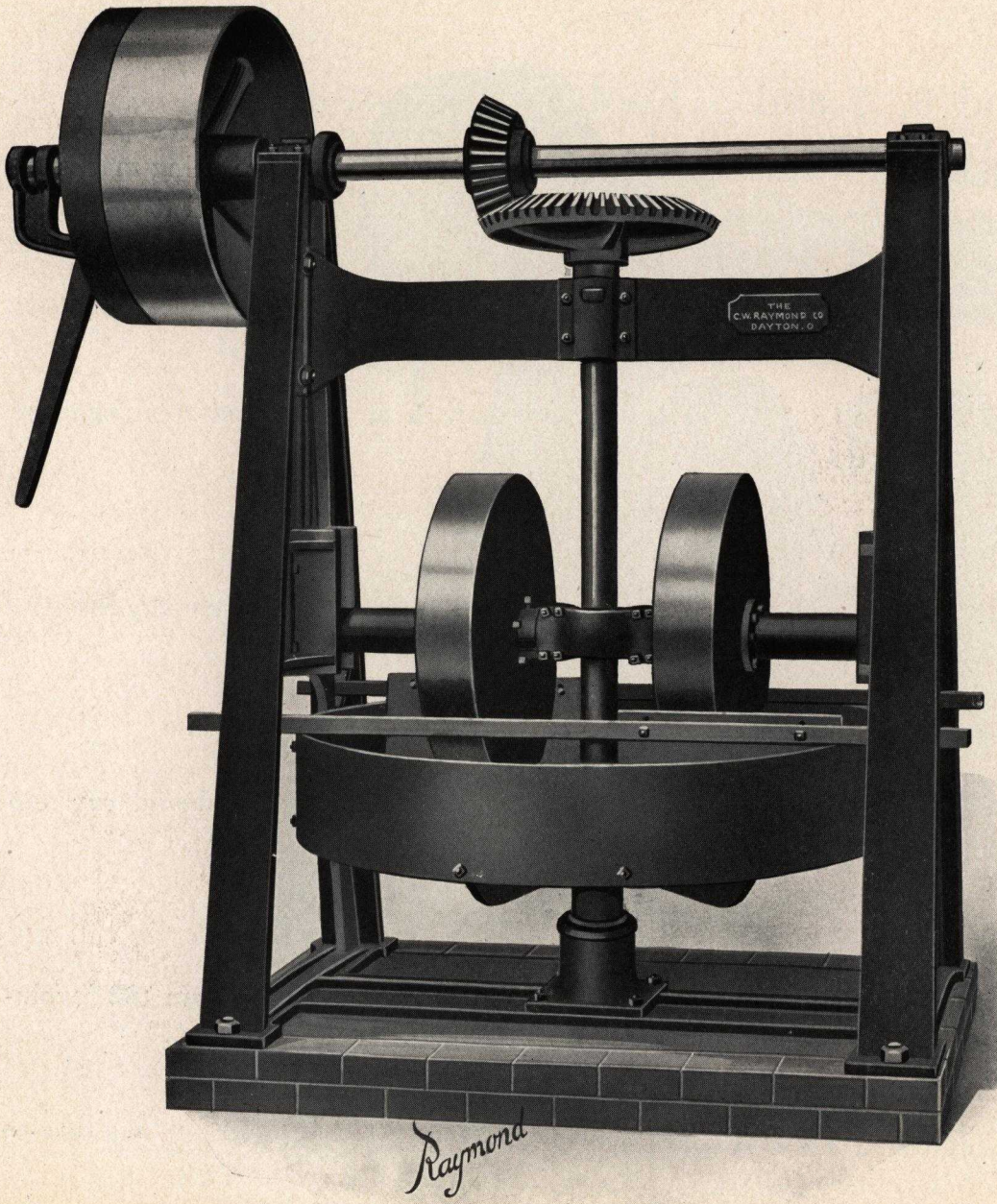
Size of mullers, 46 x 8 inches. Four arm type friction clutch pulley 42 x 12 inches, which should run 125 revolutions per minute. Approximate weight, 26,000 pounds.

THE RAYMOND 7 FOOT DRY PAN.

Size of mullers, 38 x 7 inches. Four arm type friction clutch pulley 42 x 12 inches which should run 125 revolutions per minute. Approximate weight, 20,000 pounds.

THE RAYMOND 5 FOOT DRY PAN.

Size of mullers 34 x 5½ inches. Four arm friction clutch pulley 36 x 10 inches, which should run 132 revolutions per minute. Approximate weight, 12,000 pounds.



The Raymond 5 Foot Grog Pan.

THE FOLLOWING specifications will convince the most skeptical of the superiority of our 5-foot Grog Pan. The Pan is substantially built throughout. The framework is accurately fitted with planed joints, drilled holes and heavy bolts. The mullers have chilled faces; they are 32 inches diameter by 6 inches face. The driving shaft is steel, 3 inches diameter. The upright shaft is cold rolled steel, $3\frac{7}{16}$ inches diameter above the pan and reinforced below to $5\frac{1}{2}$ inches, forming a solid shoulder for the disc plate to rest upon. The step is provided with bronze metal anti-friction bearing, over which fits a dust proof cap which excludes all dirt or grit. The screen plate openings are $\frac{1}{8}$ inch; however, we make them of any size required. The clutch pulley is 36 inches diameter by 8 inches face. Should run 70 revolutions per minute. Approximate weight, 8,000 pounds.

The Raymond Wet Pans.

AFTER a close study of the conditions under which a Wet Pan is compelled to operate, as well as scrutinizing closely the requirements of its product and realizing that many Wet Pans in use in some of the various fire brick and other plants of the United States, are not up to their possible standards, we have evolved the Wet Pan we are now offering to the clay worker. It is as near absolute perfection as the best mechanical and engineering skill can make.

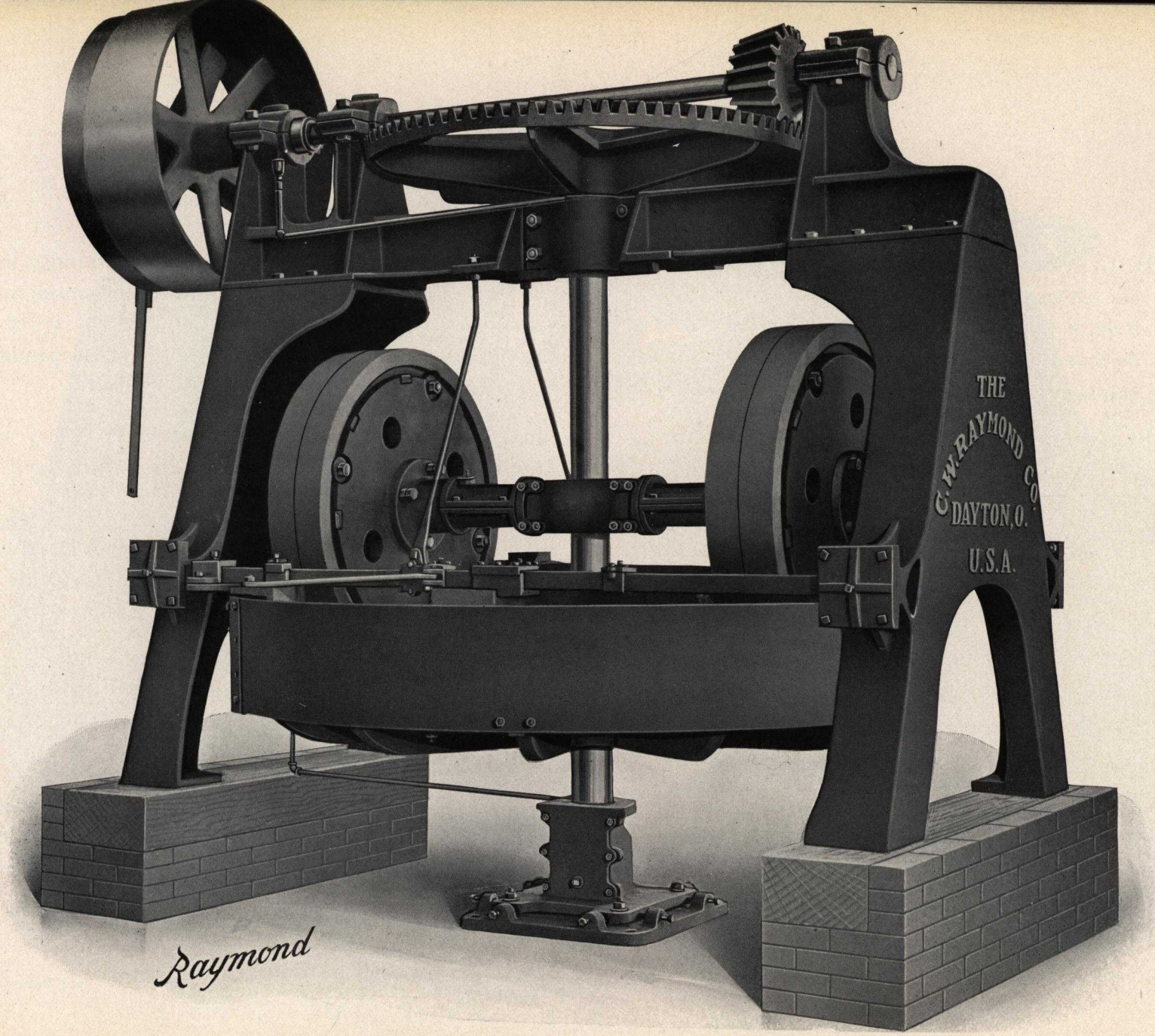
In addition we have designed a complete series of Wet Pans which are constructed along the same general lines and with like principles of strength and efficiency as our Dry Pans.

A Wet Pan is conceded to be the very best pugging machine for clays that has ever been invented, providing, of course, it is properly constructed. The side frames of our machines are massive, the disc sufficiently strong to withstand the continual strain caused by the movement of the mullers during their action on the material. The side frames are of such size that they positively insure as rigid a machine as can be made, which is necessary for long life and perfect operation. We also have in our Wet Pans the extra added advantage of the Raymond Three Bearing Cross Rail allowing the machines to operate in either direction and with the pinion close next to a bearing, which principle is well known to be one of the requirements of good mechanics. This occurs in all of the larger size machines, the 5 foot and under being excepted.

Various styles of mullers can be used on any of the machines to meet the necessities due to the local peculiarities of the material.

The shaft used in the Raymond Wet Pans is of high grade steel, the upright or vertical shaft being hammered or forged from one solid billet of steel and, at the same time the collar which supports the disc, is forged therewith, making it an integral part of the shaft, eliminating all possibility of any trouble of any kind from this source.

The step bearing is one of the most important parts of a Wet Pan. We equip all of our Pans with the new famous Raymond Step which is illustrated in connection with the subject of Dry Pans. This step has never been known to heat or to give trouble under the most rigorous service.



The Raymond Nine Foot Wet Pan.

The Raymond 9, 8, 7 and 5 Foot Wet Pans.

OUR 9 Foot Wet Pans are furnished in either Heavy Duty, Low Frame, or Standard Construction. These Pans so far as side frames, cross beam, disc, step and shafts are concerned are identical with our Dry Pans of the same size. Mullers are regularly furnished 52 inches in diameter with 10 inch face, but any width face is furnished on order.

The floor space required for the 9 Foot Standard Pan is 14 feet 9 inches long by 9 feet wide. Its height from bottom of base plate to top of pulley is 12 feet 4 inches. The four arm type friction pulley is 42 inches diameter by 14, 16 or 18 inches face and should make 87 R. P. M. Approximate weight 31,000 pounds.

The specifications for either the 9-Foot Heavy Duty or Low Frame Wet Pans are practically the same as those given above for the standard.

THE RAYMOND 8 FOOT WET PAN.

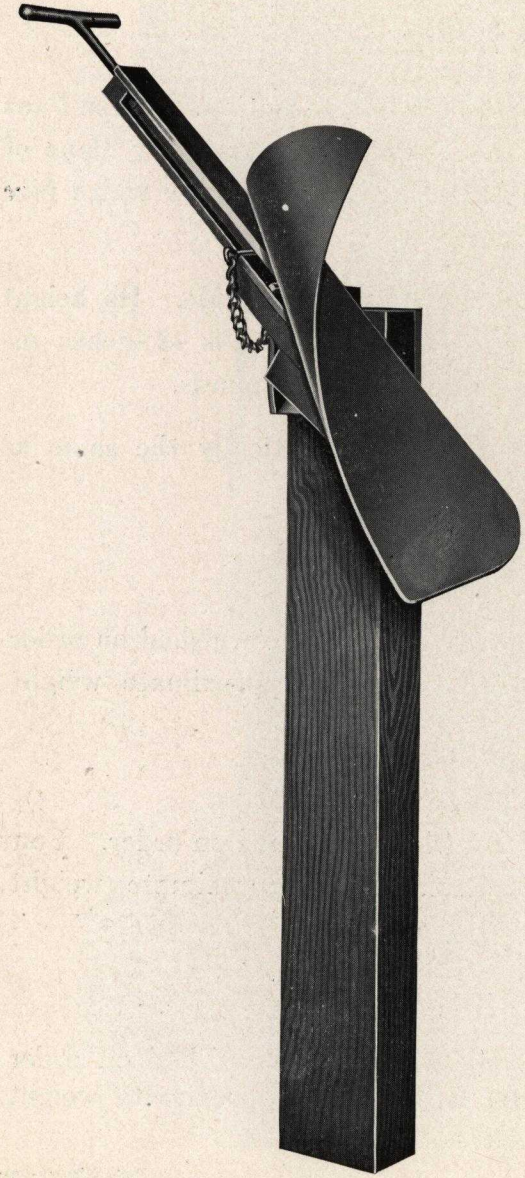
Size of mullers 40 inches diameter. Regular width of face 6¼ inches, but any width face furnished on order. Four arm type friction clutch pulley 42 inches by 12 inches which should run 87 R. P. M. Approximate weight, 26,000 pounds.

THE RAYMOND 7 FOOT WET PAN.

Size of mullers, 40 inches diameter. Regular width of face, 5 inches, but any width furnished on order. Four arm type friction clutch pulley 36 inches by 10 inches which should run 100 R. P. M. Approximate weight, 20,000 pounds.

THE RAYMOND 5 FOOT WET PAN.

Size of mullers, 40 inches diameter. Regular width of face 5 inches, but any width face furnished on order. Four arm type friction clutch pulley 36 inches by 10 inches which should run 100 R. P. M. Approximate weight, 12,000 pounds.



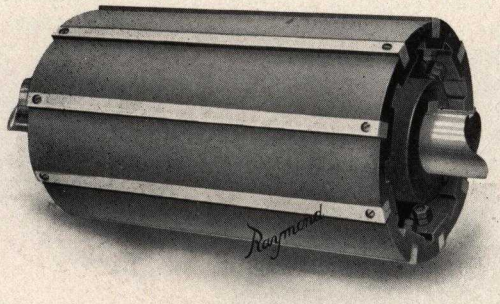
The Raymond Automatic Wet Pan Emptier.

THIS is a unique application of an old principle. The illustration shows the appliance as it would appear from the interior of the pan, and by pulling out the pin stop and pushing the emptier to the bottom, the clay is plowed out in the same manner as a plow share turns the earth. The material falls into a wheelbarrow or on a conveyor as may be desired.

In construction, it consists of a substantial grey iron guide, secured to an eight inch post, and in which works a sliding arm holding the blade.

Its novel features and simplicity should commend it to the careful user as there is no cost of up keep, and is entirely independent from the pan. It is made for pans running clockwise or counter-clockwise, consequently, care must be used in ordering to specify which is desired. Weight about 150 pounds.

The Raymond Disintegrators and Crushers.



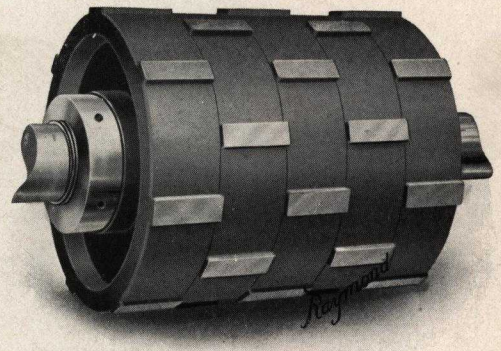
Adjustable Knife Roll.

WE MANUFACTURE a very complete line of these machines, adapted to every condition and all kinds of clays. They are designed for capacity and speed with minimum consumption of power. Our long experience with this class of clayworking machinery has enabled us to overcome all of the common faults found in other machines of the same kind. Simplicity, by the reduction of working parts to a minimum, combined with the necessary weight and strength, has been our aim.

All wearing parts are easily removed and replaced, and wherever possible we have provided instantaneous adjustment to take up wear.

The oil reservoirs in the bearing boxes are large and easy of access and are provided with dust proof caps which prevent the entrance of clay, dust or grit.

We manufacture two different styles of cutting rolls for these machines either one of which can be furnished as desired. The older and most substantial method is the cast lug roll with the cutting lugs set alternate, while the adjustable knife blade is so constructed that the cutting edges of the knives are separate from the roll and renewable. When these become worn they can be shimmed under and raised to sufficient height to perform their service equally as well as when new. Also, by reversing them a new cutting edge can be presented to the material, greatly increasing the efficiency of the entire machine. This is done until the knives are completely worn when new ones are as readily inserted.



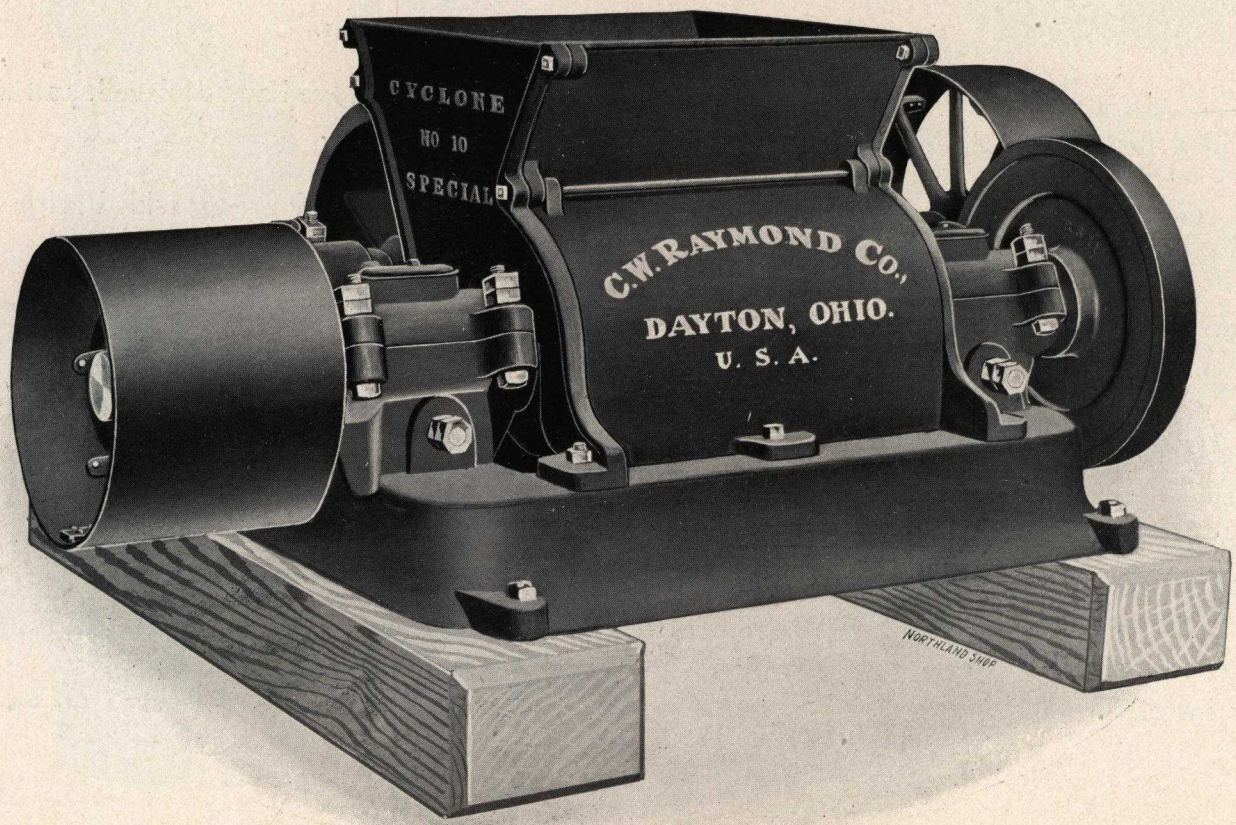
Cast Lug Roll.

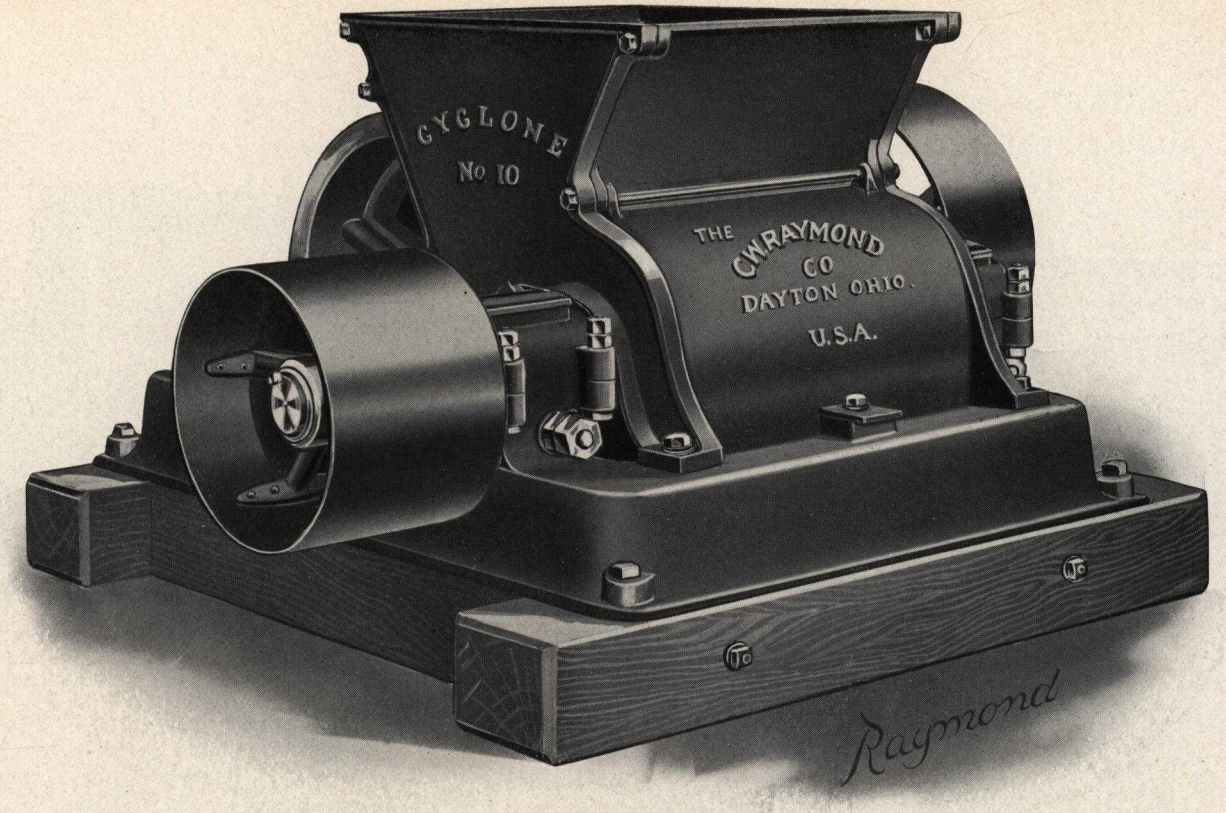
The Raymond No. 10 Special Disintegrator.

THE Disintegrator is designed to prepare dry, lumpy clays direct from the bank, for the tempering process. It thoroughly shreds the clay, pulverizing all small stones and separating large ones and puts it in the best possible condition for a Pug Mill or Brick Machine. The high speed roll is made in sections having projecting teeth set alternately one with the other. These sections are interchangeable and reversable on the shaft. The large roll is a slow speed feeding roll with adjustable bearings.

The No. 10 Special is equipped with a heavy balance wheel which insures steadiness of operation and uniform speed.

The feed roll is 28 inches in diameter by 25 inches face. The cutting roll is 16 inches diameter by 25 inches face. The shafts are $4\frac{7}{16}$ inches in diameter, of steel, with 15 inch bearings. The feed roll driving pulley is 30 inches diameter by 10 inches face and should run from 100 to 125 R. P. M. The cutting roll driving pulley is 18 inches diameter by 14 inches face and should run 700 to 800 R. P. M. Approximate weight 6500 pounds. Capacity from 60,000 to 100,000 brick per 10 hours. Length 6 feet 10 inches. Width 6 feet 10 inches. Height 3 feet 6 inches.



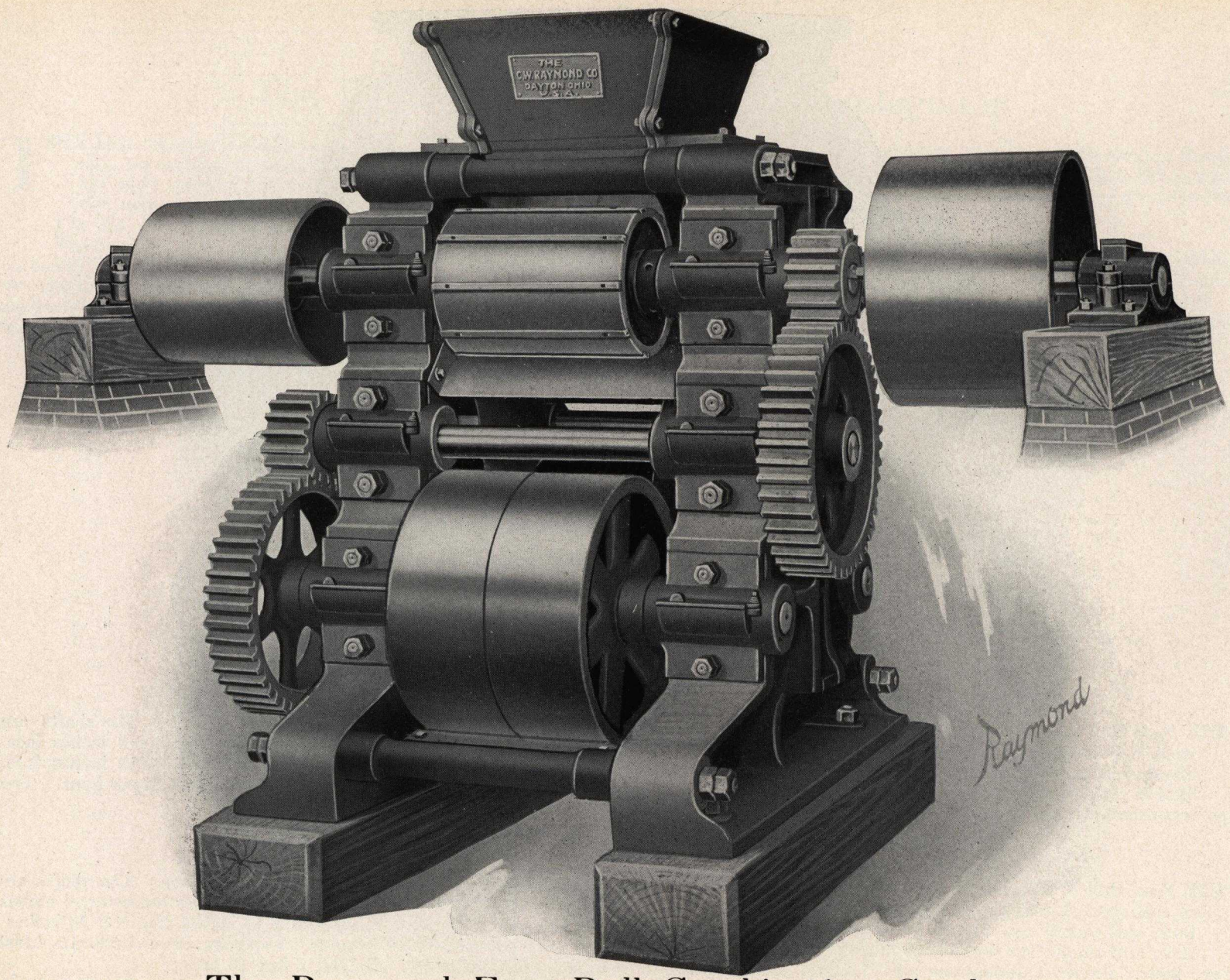


The Raymond No. 10 Disintegrator.

THE Feed Roll is 24 inches diameter by 18 inches face. The Cutting Roll is 16 inches diameter by 18 inches face. The shafts are steel, $2\frac{5}{16}$ inches diameter, with 12 inch bearings. The driving pulley of the Feed Roll is 24 inches diameter by 8 inches face. Should run from 125 to 150 revolutions per minute. The driving pulley of the Cutting Roll is 14 inches diameter by 10 inches face. Should run 750 to 800 revolutions per minute. Approximate weight 4,000 pounds. Capacity 4,000 to 6,000 brick per hour. The extreme dimensions are: Length, 5 feet 2 inches. Width, 5 feet 8 inches. Height, 3 feet 1 inch.

The Raymond No. 20 Disintegrator.

THE Feed Roll is 18 inches diameter by 14 inches face. The Cutting Roll is 12 inches diameter by 14 inches face. The shafts are of cast steel, 3 inches diameter, with bearings 10 inches long. The driving pulley of the Feed Roll is 24 inches diameter, 6 inches face, and should run 125 to 150 revolutions per minute. The driving pulley of the Cutting Roll is 12 inches diameter 10 inches face, and should run 800 to 1,000 revolutions per minute. Approximate weight, 2,500 pounds. Capacity from 2,500 to 4,000 brick per hour. Extreme dimensions are: Length, 4 feet 11 inches. Width, 4 feet 11 inches. Height, 2 feet 10 inches.



The Raymond Four Roll Combination Crusher.

The Raymond Four Roll Combination Crusher.

FOR clays that require an extra amount of preparation, or those having a limited amount of small stones or of a lumpy nature, the Four Roll Combination Crusher will be found indispensable.

The machine combines the features of a disintegrator and smooth roll crusher. The upper section is made of two rolls running at variable speed. The small or high speed roll has projecting lugs or cutting knives. The large roll operates at a slower speed. The effect of these rolls is to shred or separate the material and prepare it for further action of the lower section. The lower section is composed of two large chilled face rolls which also run at differential speed. All rolls are of hard chilled iron. They are built in segments which are interchangeable, as these segments wear in the center they can be replaced by those from the outer edge insuring perfect contact between the rolls at all times.

The large steel shafts upon which the rolls are built are feathered their entire length, they have a solid collar at one end and a heavy nut at the other; between these points the segments which compose the rolls are clamped.

The side or adjustable boxes are extremely heavy and operate on two planed surfaces. Two long bolts run through the cap of the slide box to the cap of the stationary box on the opposite side, through these heavy bolts is secured the medium of adjusting the rolls to any desired width. The caps for bearings are all planed on face and edge and machine fitted to seat. All shafts are steel and all bolts provided with jamb nuts. The drive for this machine is secured from two pulleys which operate directly on the upper rolls. The lower section is operated from these by a series of gears.

It is of interest to note that, whether from an engineering, artistic or practical point of view, our Combination Crusher is the embodiment of the highest ideas in modern machine construction. It is strictly a high class machine from turret to foundation.

The Raymond Four Roll Combination Crusher is built in three sizes, with rolls having 18 inch, 24 inch and 30 inch faces. A glance at the specifications will readily show its enormous strength

18 Inch Combination Crusher.

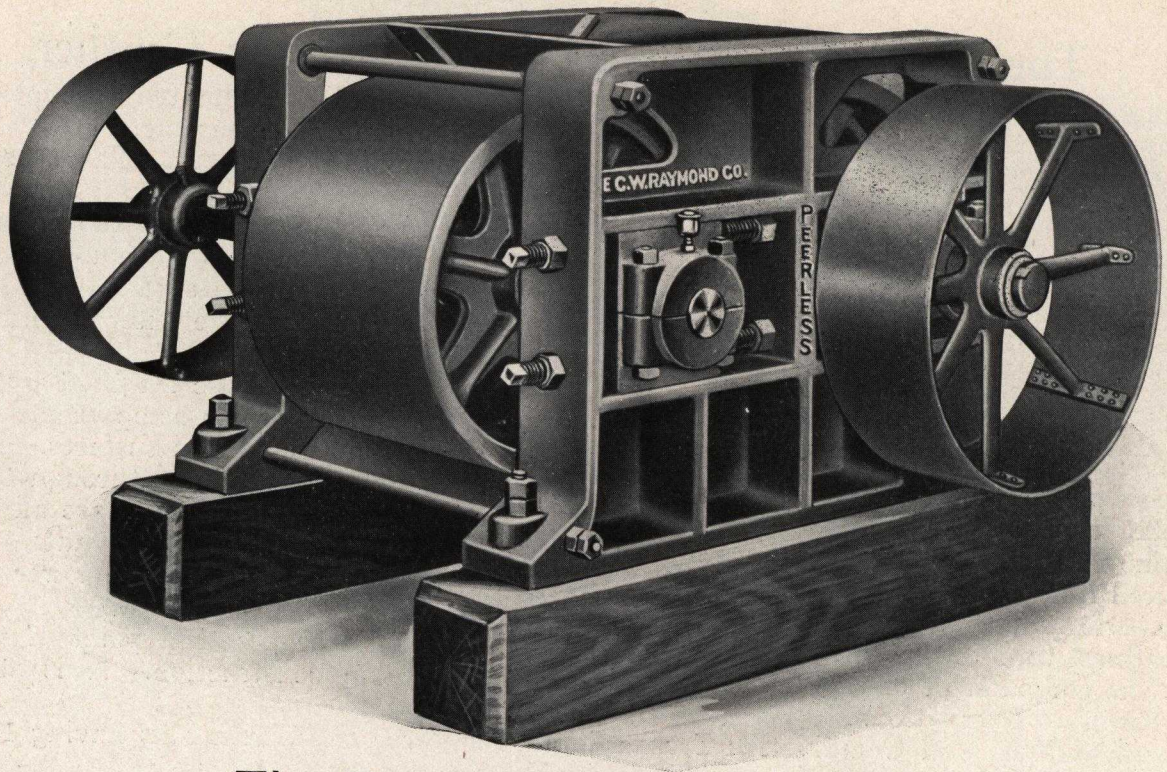
Floor Space, 4 feet 6 inches x 7 feet 6 inches.
Approximate weight, 11,000 pounds.
Large pulley, 24 inches x 16 inches should run 160 revolutions per minute.
Small pulley, 16 inches x 16 inches should run 800 revolutions per minute.
Feed roll shaft, $3\frac{7}{16}$ inches.
Other shafts, 3 inches.

24 Inch Combination Crusher.

Floor space, 4 feet 6 inches x 8 feet.
Approximate weight, 12,500 pounds.
Large pulley, 24 inches x 16 inches should run 160 revolutions per minute.
Small pulley, 16 inches x 16 inches should run 800 revolutions per minute.
Feed roll shaft, $3\frac{7}{16}$ inches.
Other shafts, 3 inches.

30 Inch Combination Crusher.

Floor space, 4 feet 6 inches x 8 feet 6 inches.
Approximate weight, 15,000 pounds.
Large pulley, 24 inches x 16 inches should run 160 revolutions per minute.
Small pulley, 18 inches x 18 inches should run 800 revolutions per minute.
Feed roll shaft, $3\frac{7}{16}$ inches.
Other shafts, 3 inches.



The Raymond Peerless Crusher.

A SMOOTH Roll Crusher of unusual heavy construction is shown herewith.

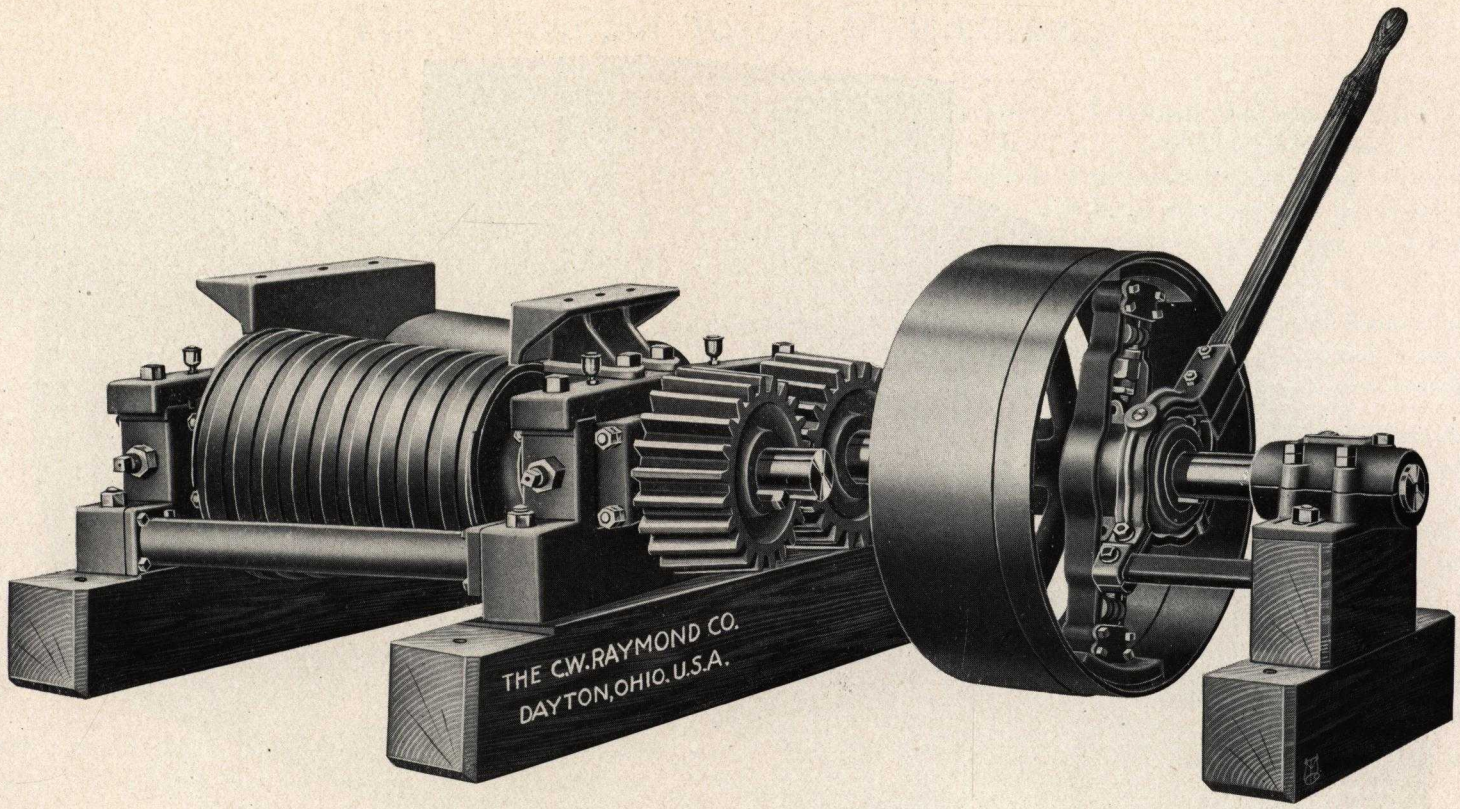
Its simplicity, as well as strength and design, commend itself to the critical buyer of this class of machinery. The heavy side frames are built in one piece of cast iron, numerously ribbed with projections 6 inches wide. These sides are held together by heavy wrought iron tie bars, passing through them from out to out, firmly uniting both frames together. In this rigid framework the large rolls operate. Means are provided by heavy adjusting screws for changing the distance between the rolls, so as to impart any degree of fineness to the material. The rolls are chilled on the faces and ground to a true surface. They are nicely balanced, so they can be operated at high speed without excessive vibration.

The shafts are of steel $3\frac{15}{16}$ inches in diameter, the bearings are unusually long and heavy.

Another innovation in crusher construction is shown in the Peerless by the adjustable hopper or feeder, whereby the amount of material entering between the rollers can be carefully regulated. This hopper can also be adjusted so as to act as a spreader for the material, feeding the rolls evenly over their entire surface.

We build this Crusher in two sizes according to the following specifications:

The No. 1. Rolls 24 inches in diameter by 24 inches face. Driving pulleys 30 inches in diameter by 10 inches face, to run from 250 to 300 revolutions per minute. Approximate weight 5,000 pounds. The No. 2. Rolls 24 inches in diameter by 18 inches face. Driving pulleys 24 inches in diameter by 8 inches face, to run from 250 to 300 revolutions per minute. Approximate weight, 4,000 pounds.



The Raymond Conical Roll Crusher.

PRACTICAL use has demonstrated the efficiency of conical rolls in removing stones, gravel, and hard lumps from clay. In addition to this we use one roll with a spiral thread operating against a smooth roll which carries the stone to the discharge spout with greater rapidity than the case of two smooth rolls and also with more certainty.

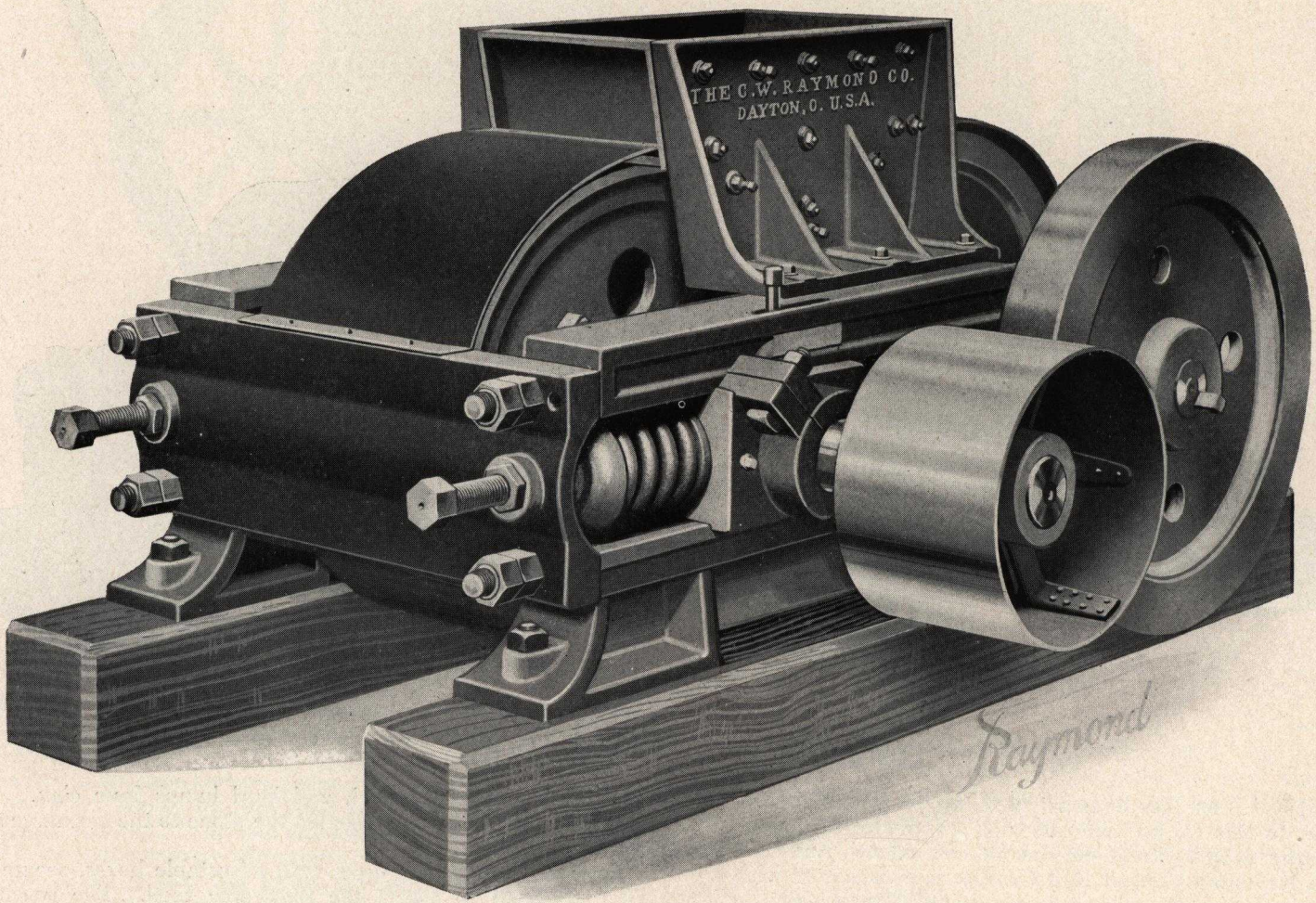
The Raymond Conical Roll Crusher is constructed with a girder frame of the built up type, with adjustable boxes, securely held at any adjustment desired. The rolls are made by two heavy heads or ends arranged to clamp the renewable shell. The gearing is well proportioned and the margin of safety in the shafting far in excess of ordinary requirements. Suitable oiling devices are supplied to all journals.

Specifications are as follows:

Width over all, 5 feet 6 inches, Length over all, 8 feet 6 inches; Height over all, 3 feet 5 inches; Rolls 20½ inches diameter at large end, and 16½ inches diameter at small end by 24 inch face.

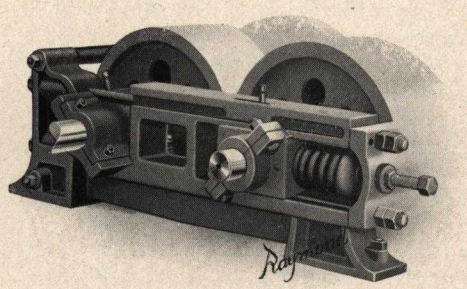
It is fitted with a four arm type friction clutch pulley 36 inches diameter by 10 inch face, which should run 250 revolutions per minute.

It weighs approximately 6,500 pounds.



The Raymond Equal Roll Crusher.

The Raymond Equal Roll Crusher.



Frame Construction.

AN INNOVATION in Roll Crusher Construction is found in the Raymond Equal Roll Crusher. In its general design, in its massive construction, in its dependability, it vies with all of the Raymond productions, being thoroughly capable of withstanding the heavy impact of crushing while running at high capacities. Made, as it is, to meet the ever increasing demands for large quantities without sacrificing the quality of the machine or its product, its framework is staunch, rolls heavy and true, bearings generous and shafting strong.

The framework of the Equal Roll Crusher, is built up of two immense side frames thoroughly secured by heavy stretchers and through going bolts and large end frames, thus uniting it into one compact superstructure, giving it the rigidity so necessary to the success of a machine of this character.

These side frames are designed, each with one solid bearing which supports the stationary roll, holding it rigidily in position, allowing the impact to be taken against a section of the machine which has no moving or adjustable parts to break. This bearing is made with an oil reservoir keeping it sufficiently lubricated to prevent heating and undue wear. Furthermore, this boxing is set angular so that the strain does not occur on the bolts, but against the solid bearing. In addition, these boxes are braced to the remainder of the framework, so that the strain is absorbed throughout its entirety, allowing no undue work to be performed by any one part of the superstructure.

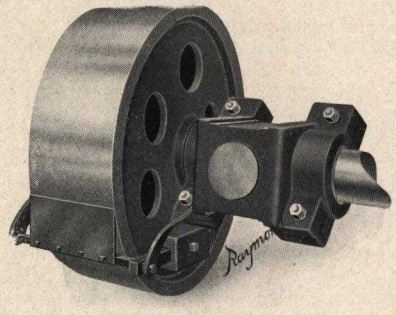
The adjustable roll is held by two massive bearings, sliding in the frames and secured in their position by two sets of screws on either side, and locked by forged nuts. The movement of these nuts allows the adjustable roll to be brought as close to the stationary roll as may be desired. Heavy springs relieve the impact on this side and allow the passage of hard foreign substances without detriment to the machine.

Both rolls are fitted with chilled, replacable wearing faces ground to true circles and balanced, thus decreasing the vibration of the machine and adding to its longevity, while the fast or stationary roll is provided with a fly wheel to insure its steady operation.

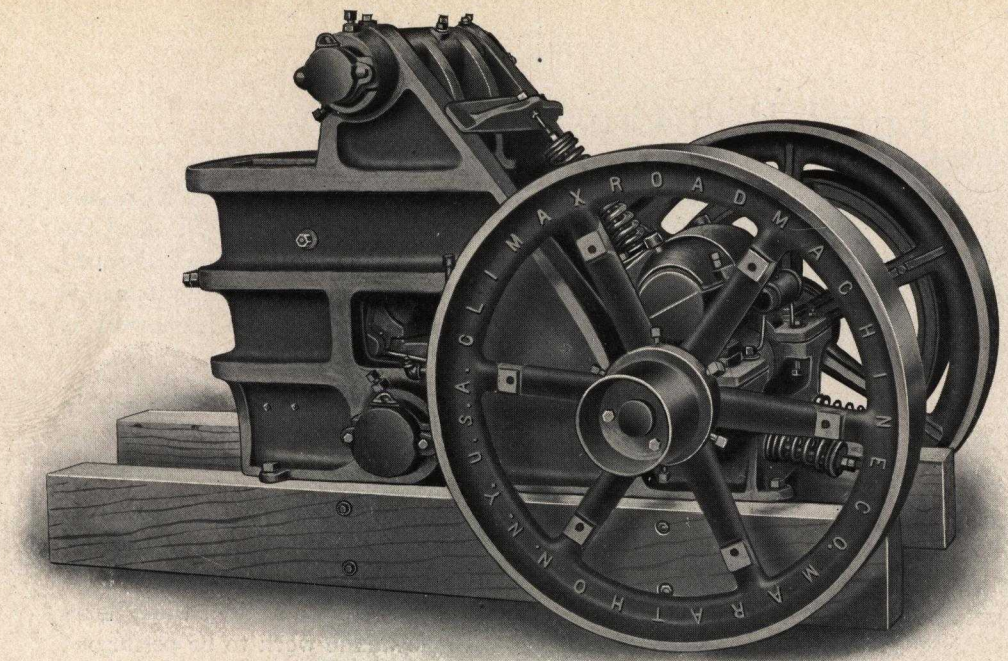
A new and novel feature of the Equal Roll Crusher is the scraper arrangement. On the adjustable roll the scraper is fastened to the bearing boxes so that it will follow the roll when it is set to position and does not require a second adjustment of this part. Both scrapers are pivoted and held against the face of the rolls by means of counter weights, keeping them constantly in contact.

It may readily be seen that every unnecessary part is eliminated, thus minimizing the likelihood of breakage, while every device is added which is conducive to convenience and perfect work.

The specifications are: length, over all, 7 feet, width, 6 feet, rolls, 30 inches in diameter by 14 inches face, pulleys, slow roll, 16 inches by 10 inches, 400 R. P. M., fast roll, 18 inches by 14 inches, 500 R. P. M. Approximate weight, 8,500 pounds.



Scraping Device.



The Raymond Climax Crusher.

THE Climax Crusher is a jaw machine and has been found of great utility in reducing shales for clay ware. In this case the effect has been to increase the efficiency of the Dry Pan fully 25% and at the same time to reduce the hard usage upon it.

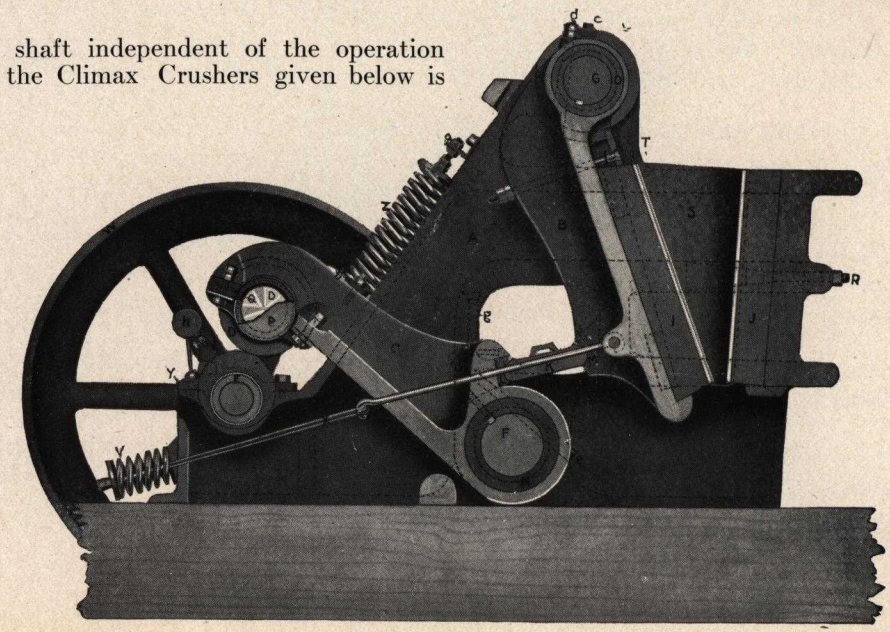
A glance at the sectional view of the Crusher fully justifies our claim of simplicity. It is constructed with a solid frame which is guaranteed absolutely against breakage. All the working parts are steel castings. The eccentrics and rolls are forgings accurately machined. The adjusting plates or toggles are iron castings chilled. These are set in steel seats in the lever and movable jaw. With these adjusting plates, the change in the size of the product is made. The use of the large adjusting plate will set the jaws closer together and give a finer product. A full set for making various grades of products is furnished with each Crusher.

A safety device is provided by means of a friction clutch. In case a steel sledge or any similar substance with a greater crushing resistance than the machine is designed to withstand, should drop into the jaws, no damage would result. The safety clutch would become operative and the balance wheels would turn on the eccentric shaft independent of the operation of the working parts of the Crusher. The rated product of the Climax Crushers given below is obtained from actual test.

SIZES, CAPACITIES, ETC., OF CRUSHERS.

	No. 1	No. 1½	No. 2
Size of top opening of jaws in inches	7 x 13	8 x 15	9 x 16
Product per hour in tons when machine closes to 2 inches	7 to 12	10 to 15	12 to 18
Weight, approximate	5,000	7,200	9,000
Speed, revolutions	300	275	275
Driving pulley, diameter and face, inches	28 x 8	30 x 8	32 x 9
Horse power required	10	12	15
Floor space required, length	5 ft.	5 ft. 7 in	6 ft. 4 in.
Floor space required, width	4 ft. 4 in	5 ft.	5 ft. 3 in.
Extreme height of machine	2 ft. 7 in.	3 ft. 5½ in.	4 ft. 1 in.

	No. 2½	No. 3	No. 4
Size of top opening of jaws in inches	10 x 20	10½ x 22	12 x 28
Product per hour in tons when machine closes to 2 inches	15 to 25	15 to 30	25 to 40
Weight, approximate	9,250	15,500	27,000
Speed, revolutions	265	265	240
Driving pulley, diameter and face, inches	36 x 11	38 x 10	44 x 12
Horse power required	20	25	35
Floor space required, length	7 ft. 6 in.	7 ft.	8 ft. 6 in.
Floor space required, width	5 ft. 9 in.	5 ft. 6 in.	6 ft.
Extreme height of machine	5 ft. 2½ in.	4 ft. 7 in.	5 ft. 7 in.



Sectional View.

The Raymond Dry Press Machinery.

FOR many years dry press brick have been very popular, both with clayworkers and brick users. No other process is so simple and by no other process can such smooth faced, uniform brick be made.

A dry press plant requires less machinery equipment than the stiff mud process, meaning as it does, simply the installation of the machinery for properly crushing the material to great fineness and elevating and screening apparatus, sometimes a clay steamer, and the Berg Dry Press. No drying system is required as the brick are set direct into the kiln and dried during the water smoking process.

The process of manufacture is equally simple. The clay from the bank is ground and screened, run into a bin over the dry press, and from there directly into the machine, where it is made into brick ready to set in the kilns.

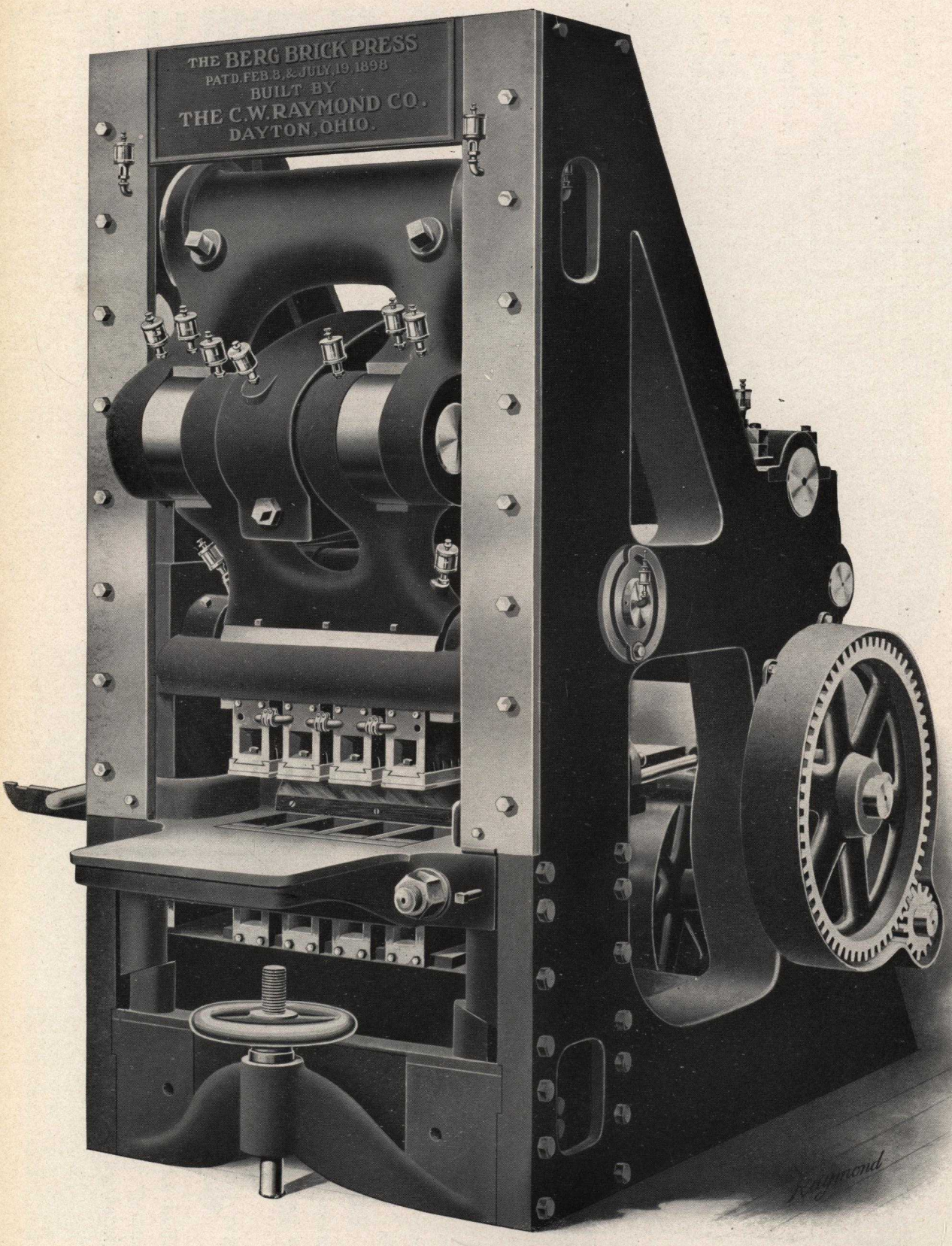
As a general rule, clays suitable for dry press work are found in good condition without the necessity of adding water. They should, as a rule, contain from 8 to 10% moisture for the best results, but, owing to the great difference in this, it is sometimes necessary to dry them or again add a slight amount of moisture by running them through a clay steamer from which they absorb sufficient water from the condensation of the steam.

A clay is often affected differently when made up by both the stiff mud and dry press process. Clays which will produce brick of a beautiful shade by the dry press method, would not be salable if made by the stiff mud method. It is, therefore, absolutely necessary in some cases, to use the dry press process. Again a dry press brick is naturally porous. In clays with a high carbon content, this is advantageous, as it is so much easier to "clear up" the color during the burning process, whereas in a stiff mud brick it might be very difficult.

One great difficulty has been constantly with the dry press manufacture and that has been to get sufficient pressure in the machine to make a solid, smooth brick without granulation, from the practically dry clay dust which is used in the process.

All of the Dry Press machine manufacturers have been struggling for years to produce a machine that would give this necessary pressure and at the same time retain a simplicity of construction.

To this end we have designed the Berg Press and are now offering the clayworker a machine which is the ideal and only perfect machine of this type. We can safely say that this press reaches as near perfection as human energy can make for it contains a minimum of parts and at the same time produces a maximum of pressure three times on each brick.



The Berg Four Mold Dry Press.

The Berg Four Mold Dry Press.

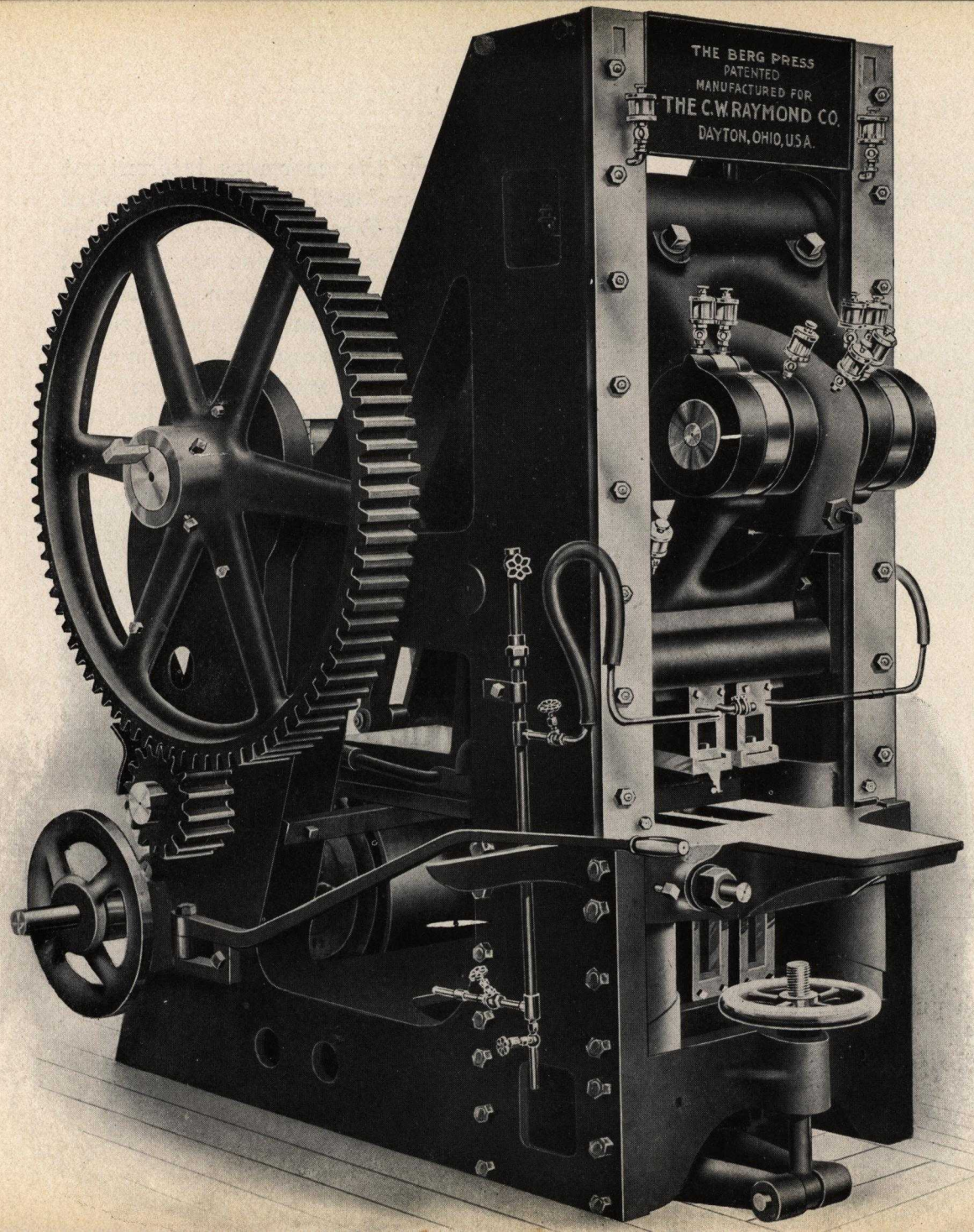
IN ORDER to meet the contingencies found in dry press manufacture, particularly the enormous intermittent pressure required for the successful manufacture of perfect dry press brick, we have found it is most economical to use the very best material and highest class construction in the make up of the Berg Dry Press. The side frames are massive; the side bars and crank shaft which absorb the entire strain of the machine are of forged steel. The bearings are few in number and generously large for the size of the shafting running in them. Wherever possible steel collars have been used to take up the principal wear, which are easily removed and replaced saving a vast amount of expense, time and loss of product when it is necessary to renew any of these worn parts, as on some makes of machines, it is necessary to replace the entire toggle mechanism to take up a small amount of wear. The driving pulley is in the rear and between the side frames, thus doing away with an outboard bearing and making the machine entirely self contained. It is shipped complete ready to set on the foundation.

The important matter of the pressure on the brick is taken care of in the Berg Press by three separate and distinct pressures. The first from the bottom, the second from the top and the third a pressure or compression between both the top and bottom plunger occurring while the brick is being lifted through the die. The great advantage of this motion is that it gives a prolonged pressure as well as moving the brick in the die while under pressure, thus thoroughly polishing it.

The feeding mechanism is so arranged that a sufficiency of clay is placed on the bottom plunger while it is level with the table and before it is lowered, allowing the material to flow evenly and level into the die preventing brick with granulated surfaces or soft ends.

All working parts are above the clay line and therefore no dust or grit can fall upon them from the action of the machine to cause undue wear. The changing of the molds is quick and easy and all four molds can be changed in less than an hour. There is no delay in having to adjust from a muddy pit beneath the machine as there are no journals, rods or springs below the table. The adjustment of the plungers is made instantaneously by means of a cam close to the operator's hand.

The capacity of the Four Mold is 20,000 brick per 10 hours. Its length is 7 feet, width 5 feet and height 8 feet. It is furnished with friction clutch pulley 38 inches in diameter by 12 inches face, which should run 210 R. P. M. Approximate weight, 26,000 pounds.



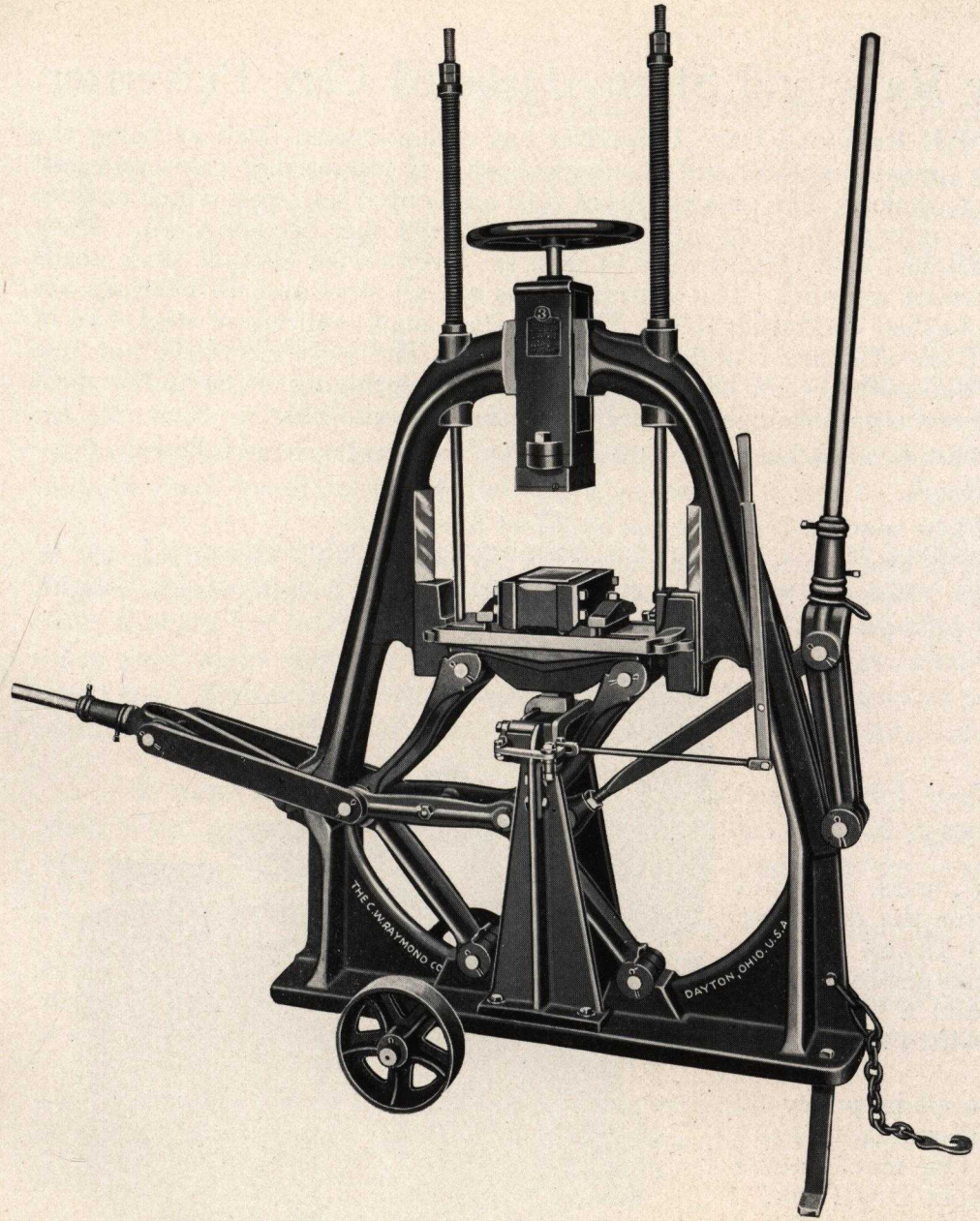
The Berg Two Mold Dry Press.

The Two Mold Press is identical in every respect to the Four Mold. The construction is proportionally as heavy and it contains every feature which makes the larger press so famous.

The brick receives three distinct pressures, the last being the prolonged pressure while the brick are being lifted out. The charging mechanism is exactly the same as in the larger machines, the lower plungers remaining at the table level until the charger has deposited the clay upon them, thus preventing brick with granulated faces and soft ends.

All working parts are above the clay line. There are no springs, rods or journals to adjust beneath the press.

The Two Mold Press has a capacity of 12,000 brick in 10 hours. It is 7 feet long, 4 feet wide and 8 feet high. The friction clutch pulley is 30 inches diameter by 12 inches face and should run 210 R. P. M. Approximate weight, 13,000 pounds.



The Raymond No. 3 Hand Press

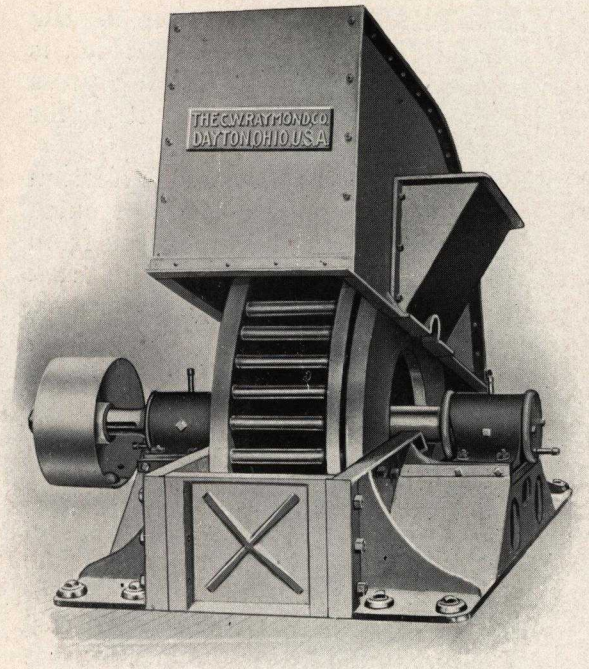
WITH DRY PRESS ATTACHMENTS.

WE ILLUSTRATE an adaption of the Raymond No. 3 Hand Press, which is used very generally in the dry press plants throughout the country for making ornamental and shape brick.

. . It consists of a Raymond No. 3 Perfection Hand Press on which is placed a die of extra depth. The brick is pressed and delivered from the die in the usual manner, but after the brick is removed, the small auxliary lever is operated, allowing the lower plunger to drop to the bottom of the die, forming a box ready to be filled with the powdered material for the next brick.

Two levers are provided, one of which is operated to press the brick and the other to assist in removing it. The most unique feature of the machine is the lower plunger pressure, whereby an upward pressure is obtained at the same time as the downward. This result is procured by resting the lower plunger on two steel cross bars which are actuated by eccentric ends on the upper toggles. These eccentrics move the lower plunger faster and farther than the die box, thus causing the brick to receive pressure from the bottom and top at the same time.

The matter of making shape brick on the large power presses is slow, unsatisfactory and expensive. By using a No. 3 Hand Dry Press the power presses can be run continuously on standard goods. Ornamentals and shapes being comparatively few in number, can be made to good advantage on the No. 3 Press and the dies can be easily and quickly changed and a large investment for dies is not necessary. The brick need not be removed from the die until the design is clearly brought out and can be watched at any stage of progress.



The Raymond Steam Jacketed Clay Pulverizer.

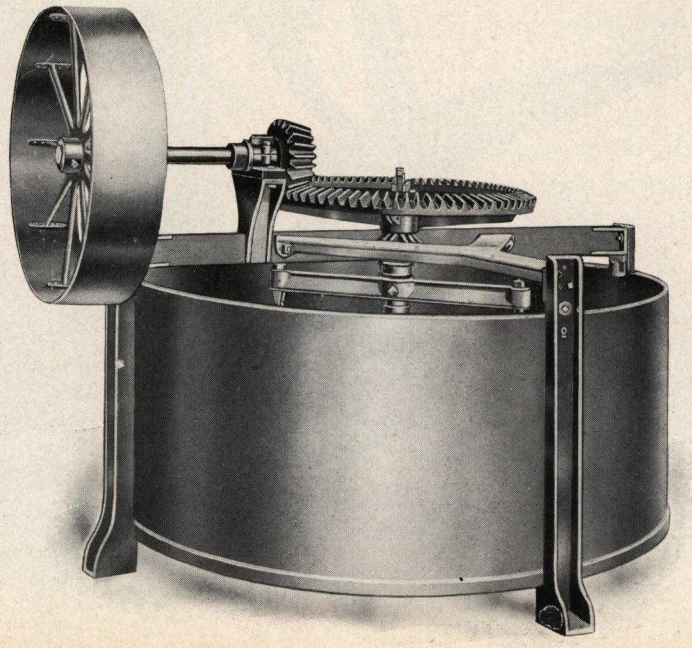
THE Raymond Cage Pulverizer has demonstrated itself as being the most practical and economical way of pulverizing clays and soft shales. The pins are fitted with a patented set screw which enables anyone to adjust new pins when the old ones become worn. They are fastened at each end with 5/8 inch set screws with counter sunk heads to prevent wearing. The wearing parts are all steel and all bearings are brass bushed and adjustable. The cages are made entirely of steel, two of which are stationary and three revolving. The pulverizer has but one shaft and pulley which eliminates the constant springing of the hollow shaft of the old style machine, eliminating entirely this trouble.

The specifications of the 42 inch clay pulverizer are as follows:

Height, 3 feet 9 inches.

Floor space, 5 feet 7 inches by 5 feet 6 inches.

It is fitted with a plain pulley 8 x 12 inches which should run 600 R. P. M. Capacity 30,000 to 60,000 brick per day. Approximate weight, 4,000 pounds.



The Raymond Clay Mixer.

THIS machine is designed for mixing clays, sand, etc., and it is especially serviceable as a feeder for the dry press machine. It consists of a large steel tub with two openings in the bottom through which the material passes into the brick machine. To the vertical shaft is attached a heavy arm operating a drag which automatically adjusts itself to the amount of material in the machine.

The Raymond Clay Mixer is fitted with a plain pulley 30 inches in diameter by 6 inches face which should run from 40 to 60 R. P. M. according to the capacity desired. One machine will take care of sufficient material for one Four Mold Dry Press.

The Raymond Soft Mud Machinery.

THE Soft Mud process of manufacturing brick, while it is the first system of machine made brick subsequenting the hand made, it is still one of the most important branches of the industry and to fill the demand for high grade machinery by this process of manufacture we are now making the most modern and complete line extant.

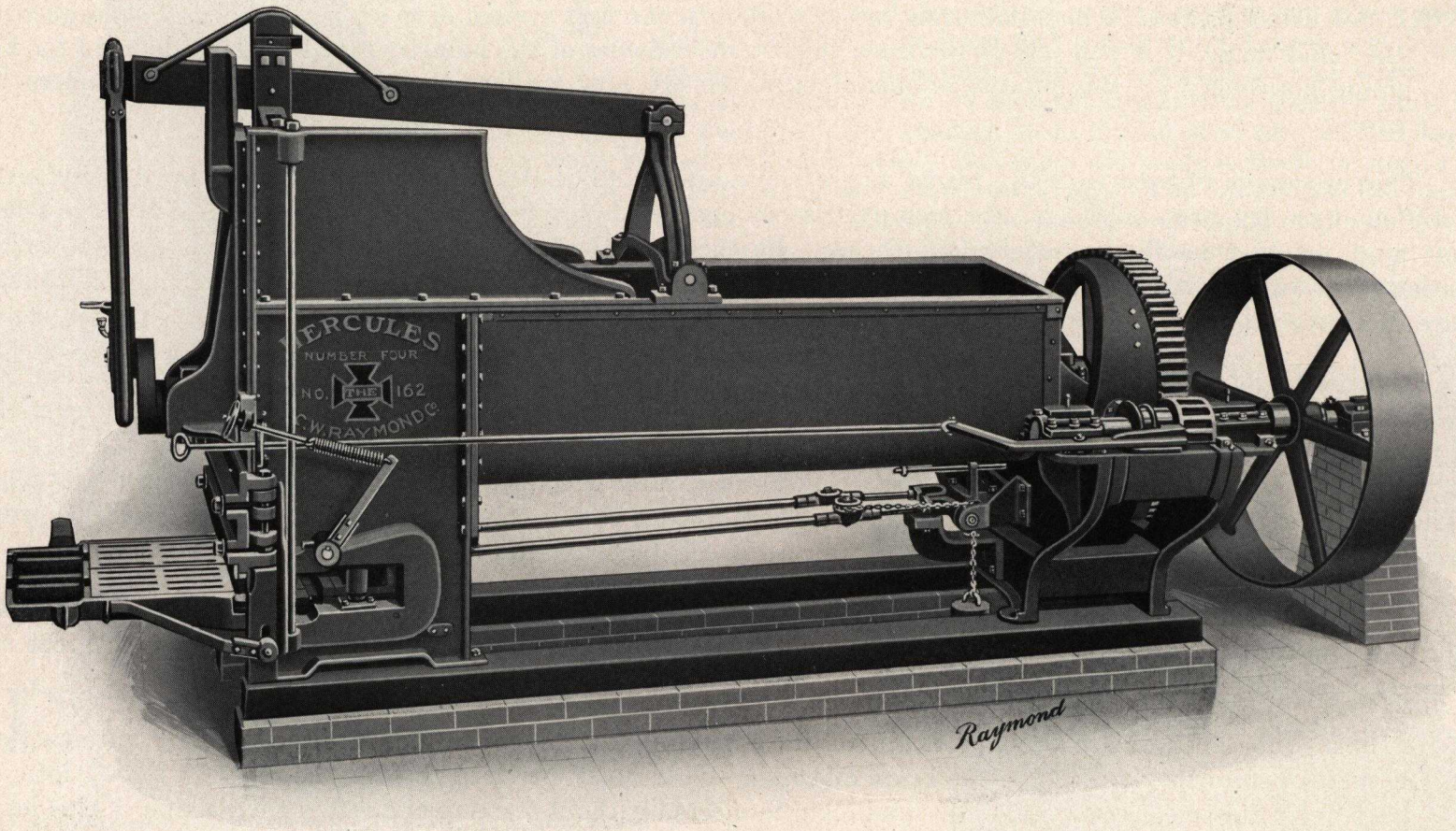
This process is utilized in many places where clays are found that cannot be practically worked by either the stiff mud or dry press methods, the manufacture of high grade fire brick and for the making of what is known as soft mud or sand mold common building brick. Furthermore the fact that a soft mud outfit is cheaper for installation than any other, has made this process popular for summer yards or where the demand is insufficient to require their operation during the entire year.

The matter of manufacturing by this process is very simple, the material being taken from the bank and preferably run through a disintegrator direct into the machine where it is thoroughly pugged and forced into the molds, thus forming the brick. The brick are then dumped onto a pallet for transportation to the dryer or placed on an open yard where they are thoroughly dried in the sun and air, after which they are burned, usually in up-draft or open top kilns. However, where the product is to be fire brick, greater care is taken in the manufacture and the proper material used for the purpose. The method, however, is substantially the same.

It must not be inferred, however, that a soft mud brick cannot be successfully dried by artificial means as such is not the case. Many plants where the demand justifies, have installed radiated heat dryers with great success largly increasing their capacities as well as minimizing the cost of manufacture.

In connection with this process of manufacture a sanding machine can be furnished which automatically sands the molds before they are fed to the brick machine. This must be done before the clay is forced into the molds, as it is by this means only that the brick can be ejected without sticking and retain their shape. This leaves a coating of sand on the brick and it is from this fact that they gain the name of Sand Mold Brick.

The machinery in general is much more simple in construction and more easily operated than that of other processes and we have succeeded in designing the most nearly perfect, simple and most substantial machinery for this grade of clay ware manufactured.



The Raymond Hercules No. 4 Brick Machine.

The Raymond Hercules Soft Mud Brick Machines.

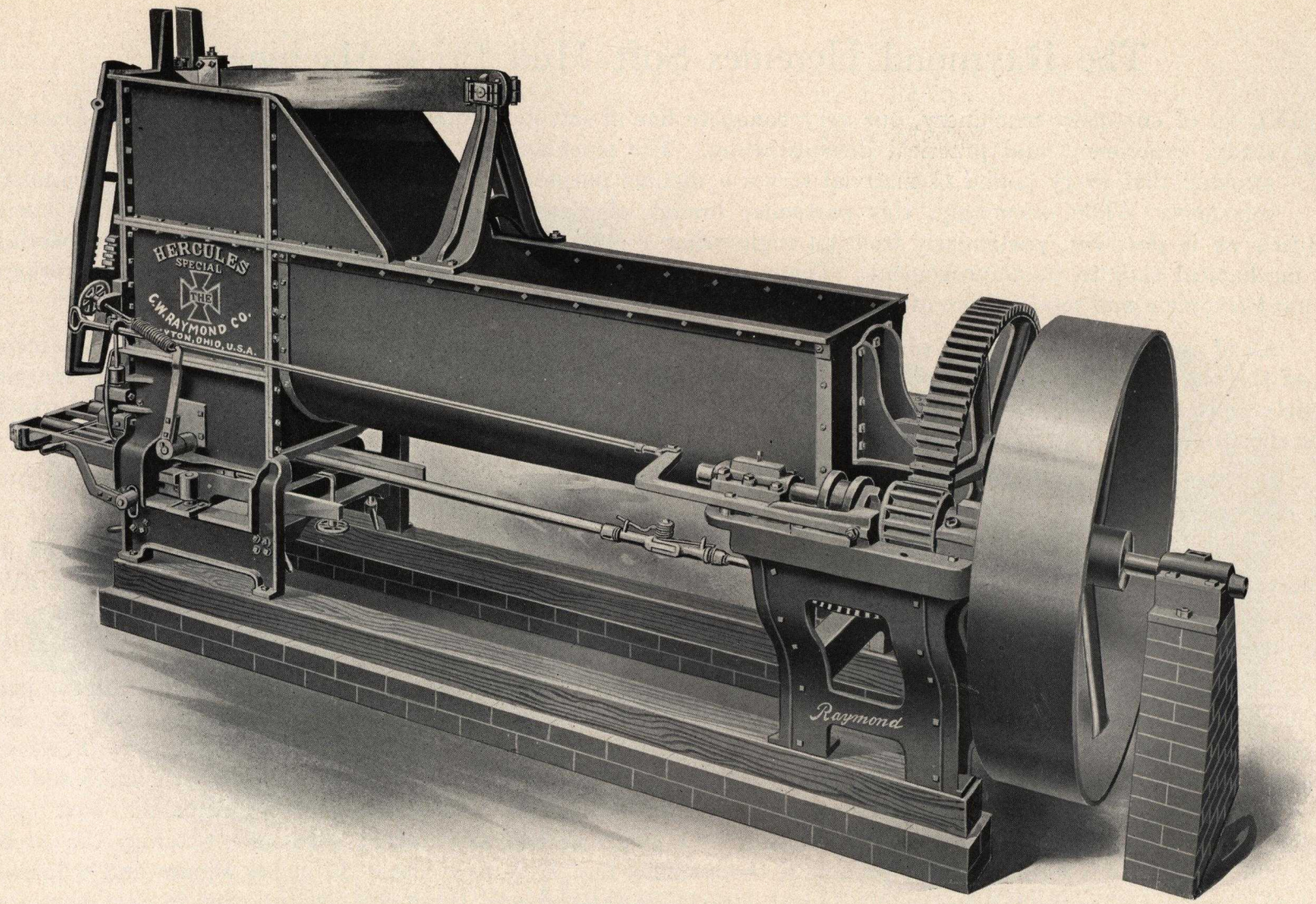
LIKE all of our other machinery, our very complete line of soft mud equipment is the result of years of careful study, experiment and practical demonstration. The machines are all built on massive lines and so constructed that every pound of material serves a distinct purpose but without unnecessary weight and cumbersomeness. While, seemingly, this particular branch of clayworking machinery has not received as much attention as it deserves, particularly from an engineering standpoint, we have devoted the best of engineering and mechanical skill to its improvement. The result of this has been that we are now placing before the clayworkers the most complete and modern line of soft mud equipment in the world.

All of our machines are built of iron and steel throughout. The shafting is of cold rolled steel with the exception of the pug mill shafts which are hammered steel, forged under heavy pressure. They all have a wide margin of safety and are exceptionally large for the work they have to perform. All joining surfaces are machine fitted which gives the utmost rigidity.

In general, the Hercules Special, the Hercules No. 4 and the Hercules Senior are constructed similarly, but with different points of vantage which makes them peculiarly adaptable to their certain uses.

The Vertical Clay Press or Plunger consists of a heavy iron head 32 inches long by 9 inches face located in the clay and working in the press box directly over the mold. Three sides of this press box are formed by the side plates of the machine. The fourth or back side next to the pug mill is formed by a wing 6 inches wide running entirely across the machine. This wing is fastened to a shaft which is long enough to receive a lever on the outside.

This wing is an automatic relief and its operation is extremely simple. Should the clay coming from the pug mill be more than enough for the molds, this wing is forced back and the surplus escapes to the pug mill. By increasing or diminishing the tension on the wing, the pressure on the clay in the mold may be regulated. Furthermore, it acts as a safety device in case any hard or foreign substance should enter the press box, this wing would be forced back allowing the plunger to reach its extreme downward movement without injuring the machine. Just back of this wing is a space or receptacle which acts as a guard against any foreign substance entering the press box. This receptacle is formed in the bottom of the machine and is a space about 32 inches square and 8 inches below the knives. This space fills with clay which remains in the machine, forming a cushion, and, in case stones or loose knives work forward, they find their way into this receptacle and never get to the press. This is an extremely valuable improvement, often saving expensive repairs.



The Raymond Hercules Special Brick Machine.

The plunger is driven by two steel arms which extend from each end of the head up to a heavy cross bar which is piveted to the walking beam on top of the machine. The walking beam is piveted at its back end to a swinging pedestal which is in turn piveted to the pugging shell. To the front end is fastened the upright pitman rod by means of a ball and socket joint.

The pitman is slotted at its lower end so as to allow the box on the wrist pin of the main crank to slide up and down in it, thus regulating the clay press. This is done by placing the pressure plate in the notches over the sliding box. The nearer the plate is placed to the sliding box the higher the press will be raised so that the required quantity of clay may be taken under the press to properly fill the mold. The wipers on the main shaft work within one inch of the press box, insuring perfect filling. The manner of filling the press box assures the making of brick which are straight and of the same weight and size when burned, the end compartments of the mold being filled equally as well as the center ones.

At each end of the press box is an adjustable plate against which the press works. This may be adjusted in order to take up any possible wear.

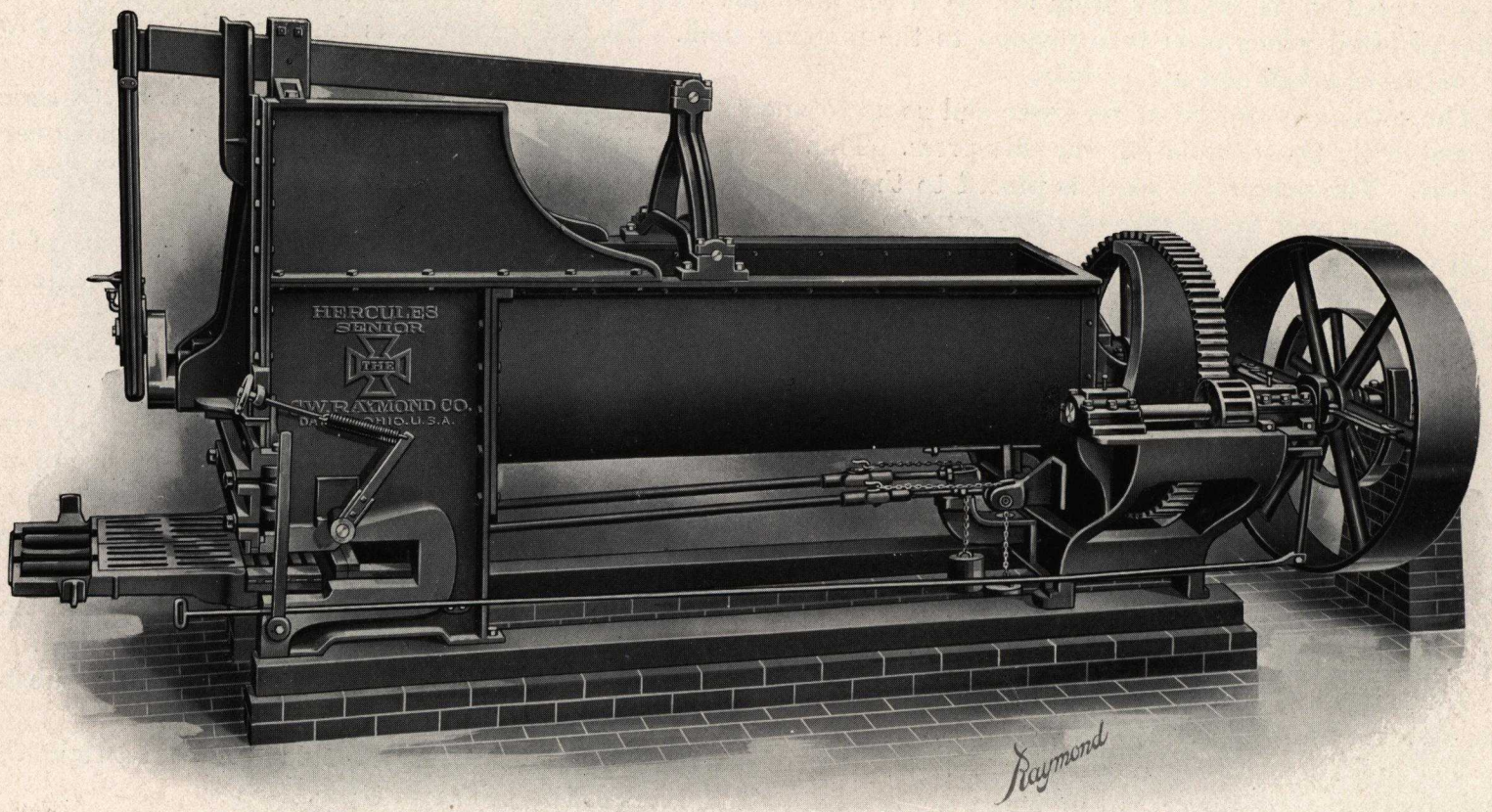
The Mold Table is arranged so that it may be raised or lowered to suit any thickness of brick, by simply turning the screws in front and rear. The molds rest on four steel rolls while being filled. These rolls are made with long bearings and an oil box is so arranged that it can be kept full of waste to keep out the sand and clay and insures the bearings being kept well lubricated. This device allows the mold to push out evenly, reducing the wear and tear on it. These rollers may be lowered or raised to conform with the surface of the mold table.

At the front end of the mold table are the usual iron rolls and bumpers. The mold table holds two molds outside of the machine thus giving the striker an opportunity to strike two molds at one stroke if he so desires.

All machines are normally fitted with automatic stone doors. In case of stone or other foreign substance getting into the mold. these doors open allowing it to pass out without injury to the molds or machine.

The mold stop will work on either side of the machine. All that is necessary to change it from a right to left hand machine or the reverse, is to change the mold stop and extension to the mold table.

The mold push out or ejector consists of a bar about the length of the mold rounded on its front side and mounted on two flanged rollers which travel on the bed plates of the mold table. To this bar is fastened two rods. These are connected and form part of the mold press slide and may be adjusted by set nuts to push the mold out the right distance. Near the back end, these rods are jointed with a simple knee or toggle joint. These joints are thrown slightly out of line and are held in place by chains which pass around pulleys fastened to the back frame of the machine. To these chains are attached weights of sufficient size to draw the mold back and which also serve to hold the toggles in position.



The Raymond Hercules Senior Brick Machine.

In the operation of the ejector, the cam on the large gear wheel moves the slide forward and in the event of the ejector meeting with greater resistance than is nesessary to push the mold out, the toggle joints allow the rods to separate, stopping the ejector and permitting the cam to pass without undue strain on either the machine or mold. The joints are then drawn into position automatically by the weights, ready for the next mold.

All bearing boxes on these machines are well babbitted and protected from the dirt and clay. At the end of the pug mill are collars on the inside and outside of the chamber so that no clay can work through and get into the bearings. A brass box is used on the main crank and the walking beam guides are also made of brass.

Among other features of interest in the Raymond Hercules line of Soft Mud Brick Machines, the most readily observed is that of the simplicity of them all as a Hercules machine has only five bearings, two gears, two revolving shafts, one cam and one crank. It is built low, consequently convenient to get the clay into it. Every part is readily accessible to the operator and wearing parts adjustable and replacable. The entire pug mill has an open top so that it is easy to get to the knives or plunger. This also enables the operator to see the condition of the clay at all times and he can instantly regulate it, should it be either too wet or too dry. The clay can be worked as stiff as it can be dumped from the mold, which is very essential in the making of strictly high class brick.

The pugging capacity is ample, which is further assisted by the action of the plunger in the material, because of its churning motion. The clay is moved at every stroke of the plunger, keeping it rolling towards the back end of the mill until it again comes in contact with knives which force it forward to the plunger again, keeping at all times a large amount of perfectly tempered clay ready for the molds.

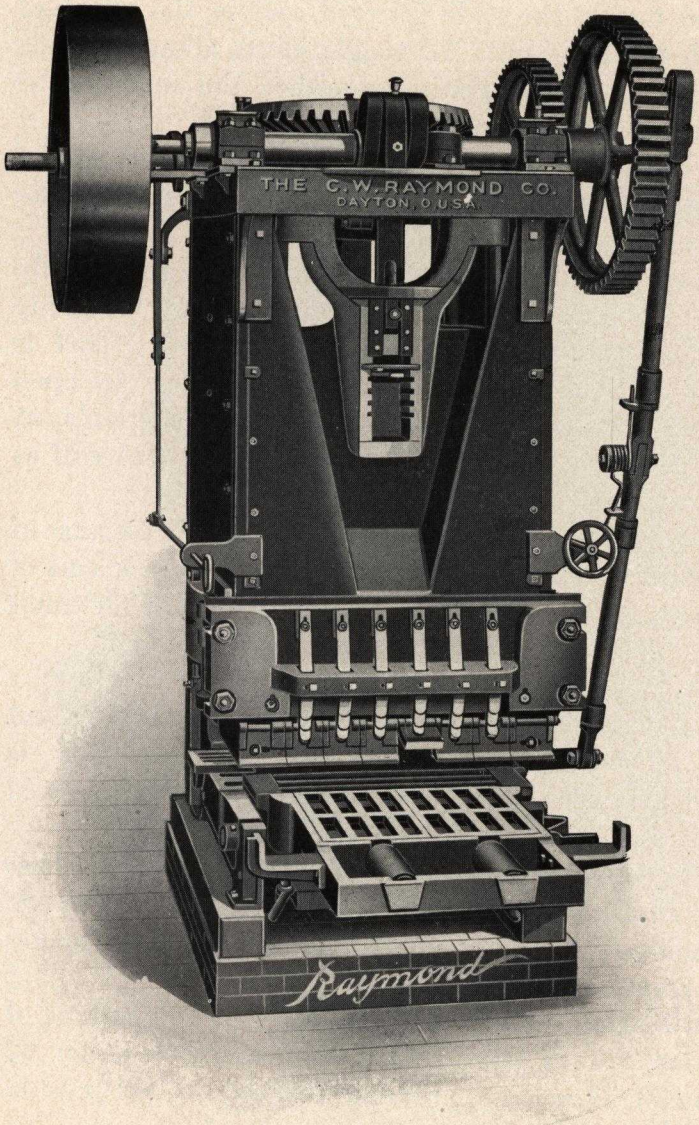
The specifications of the various machines are as follows:

The Hercules No. 4 Brick Machine is built expressly for the manufacture of silica fire brick and can also be used to make common sand mold brick. Its capacity is from 40,000 to 50,000 common fire brick in 10 hours. It is fitted with a friction clutch pulley 62 inches in diameter by 12 inches face which makes 6 revolutions for one mold of brick. Approximate weight, 20,000 pounds.

The Hercules Special Brick Machine is built especially for the manufacture of common fire brick or larger sizes than ordinary. Its capacity is 30,000 to 40,000 common fire brick in 10 hours; larger brick in proportion up to 30 x 15 x 6 inches. It is fitted with a friction clutch pulley 62 inches in diameter by 12 inches face which makes 6 revolutions for one mold of brick. Approximate weight, 17,000 pounds.

The Hercules Senior Brick Machine is one of the most popular machines on the market today for the making of common brick. Its capacity is from 40,000 to 50,000 brick in 10 hours. It is fitted with a friction clutch pulley 62 inches in diameter by 12 inches face which makes 6 revolutions for one mold of brick. Approximate weight, 16,000 pounds.

The Raymond Hercules Machines can also be built with bevel gearing.

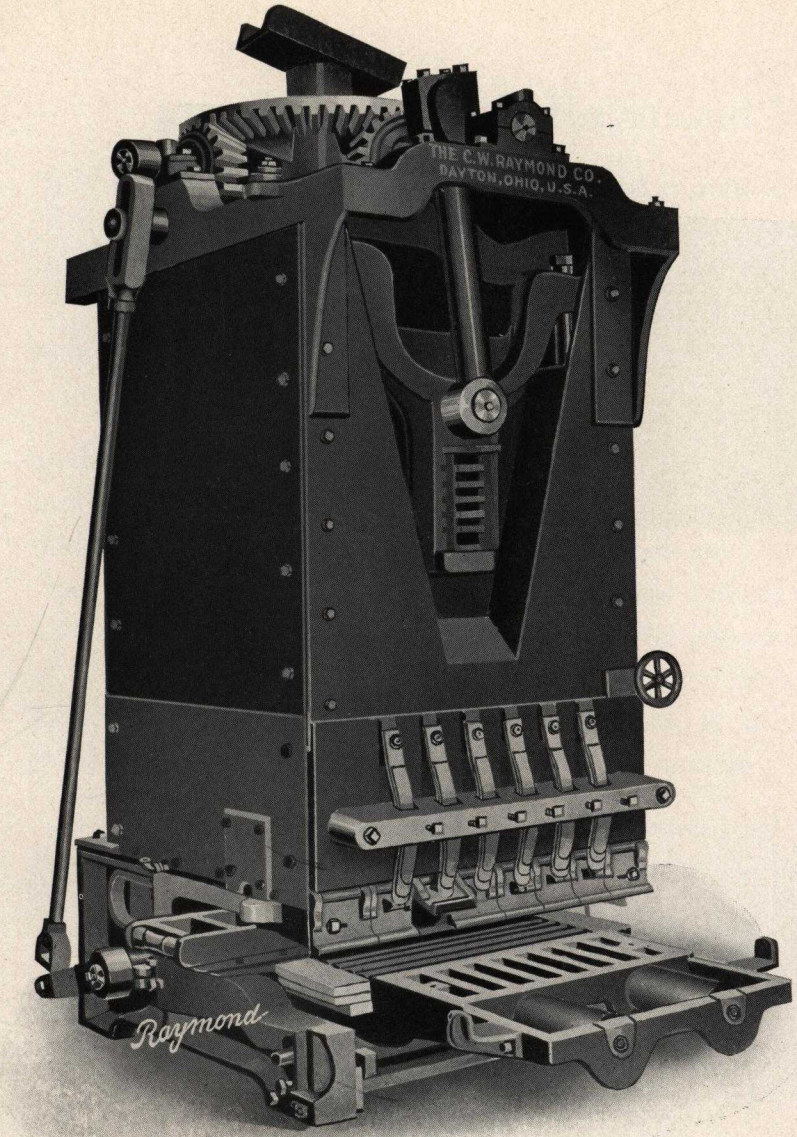


The Raymond Ideal Brick Machine.

THIS machine is designed to meet the requirements of the brick maker who needs a heavy, substantial, modern, all iron and steel machine. In general construction it is made with the same care and precision as the famous Hercules line, being built upon a heavy gray iron base to which is bolted four substantial uprights which form the corners of the machine and support the sides and gearing. There is a four inch square shaft to which the knives and wipers are fastened in such a manner that they can be removed without taking apart the machine. The sides are so fastened that they can be readily removed to get into the interior in case of necessity, even though the machine is full of clay.

The crank shaft and pug mill are driven by separate shafts avoiding severe strains on the shafting and gearing, and so arranged that it is impossible for them to get out of time. The clay press or plunger is located inside of the pug mill and works in the clay similar to the Hercules. This machine is also fitted with the automatic relief and, in fact, the front portion is almost identical with that of the Hercules, the great difference in the two machines being merely that the Ideal is upright instead of horizontal. The mold table has a quick drop arrangement and it is furnished with a hinged front and stone doors.

The Raymond Ideal Steam Power Brick Machine is fitted with a friction clutch pulley 44 inches by 10 inches which runs 12 revolutions to each mold of brick. Its capacity is 30,000 to 40,000 brick per day and weighs approximately 8,000 pounds.

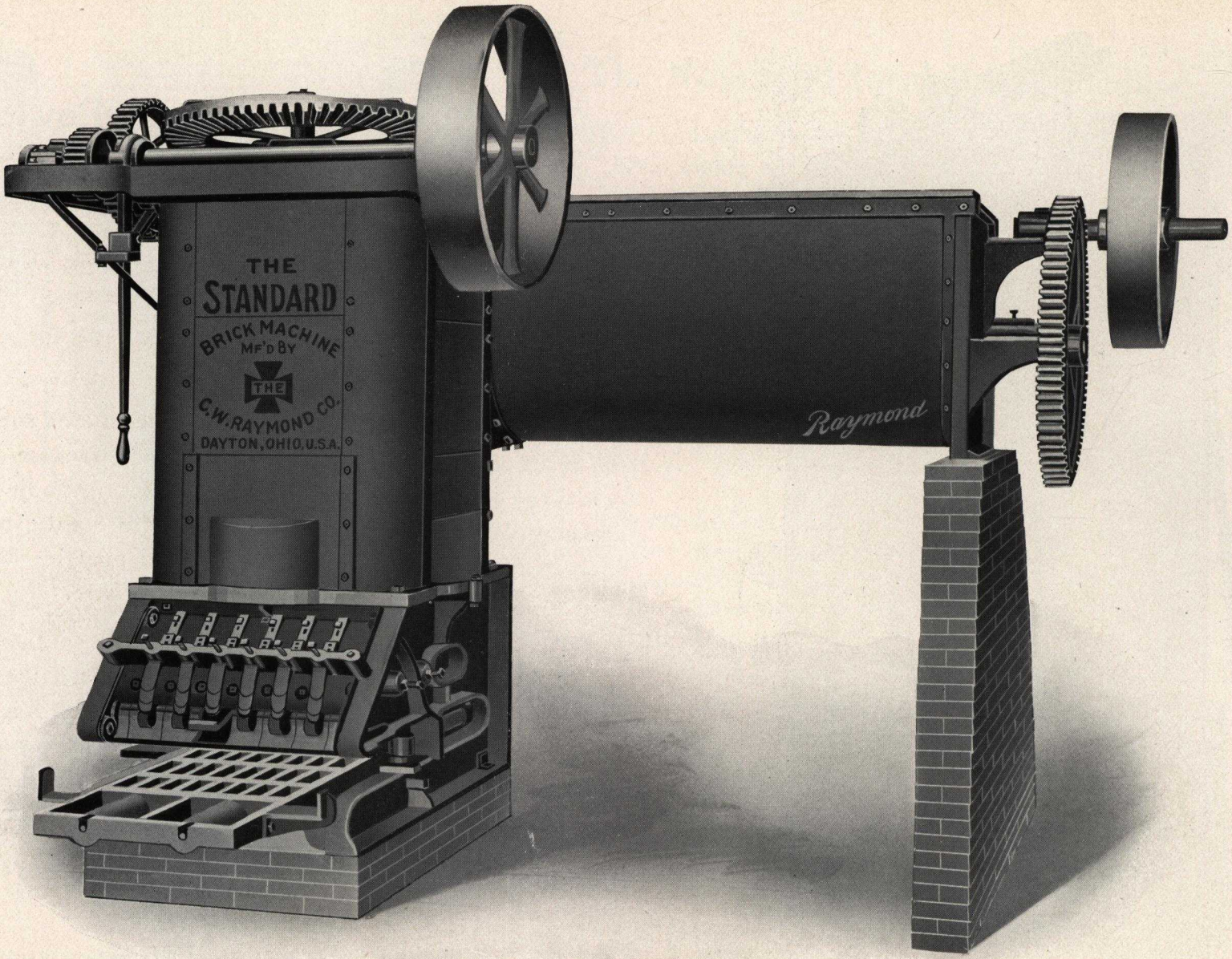


The Raymond Ideal Horse Power Brick Machine.

THE Raymond Ideal Horse Power Brick Machine is identical in construction with the Ideal Steam Power with the exception that the pulley and driving mechanism are omitted and the sweep iron for attaching the shaft substituted.

While this machine is heavy in construction and substantial in all of its parts, it runs extremely easy, because of the care given to it in its manufacture. It has the adjustable pressure plate in the front, and in case of necessity, by entirely removing this plate, the clay press may be stopped without stopping the entire machine or the horse.

The automatic relief valve is also fitted to the horse power machine, making it one of the most valuable machines of its kind for medium sized yards. Its capacity is from 20,000 to 30,000 brick per day and it weighs, approximately, 8,000 pounds. If desired, brick makers using this machine may at any time purchase the necessary parts to convert it into a steam power outfit.



The Raymond Standard Brick Machine with Pug Mill.

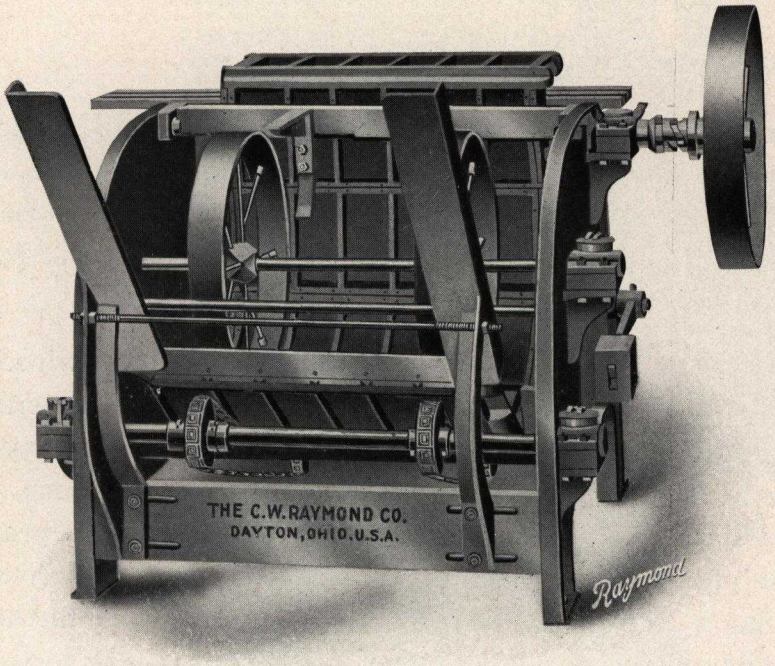
The Raymond Standard Brick Machine.

IN CONSTRUCTION and operation the Standard Brick Machine deviates from the build of the Ideal and Hercules Machines in that it has the horizontal type of plunger, which design is preferred by many users of soft mud machinery. Great care is used in the construction of the Standard Machine, and it is as thoroughly strong and skillfully made as it can well be. The pugging chamber is constructed of steel with the sides bolted to the four corner posts making the sides readily removable for cleaning, replacing of worn or broken knives, etc.

At the bottom of the pugging chamber the sides are curved outward in order to allow the use of longer wipers, enabling the machine to perfectly fill all corners and both ends of the press box, equalizing the amount of material in all parts, and, of course, it follows that the brick made by this machine, will dry and burn with equal shrinkage, making them of a uniform size. Another distinct advantage in the construction of the Standard Brick Machine, is that the press box is located under the wipers instead of at the sides, allowing the material to fall down into the press box which assists in the even distribution over the mold. The plunger then forces the clay against the angled front of the machine which deflects it downward into the mold giving it additional pugging and, at the same time, further assisting the even distribution. This machine is also fitted with stone doors allowing the passage of stones or foreign substances without injury to the machine or molds.

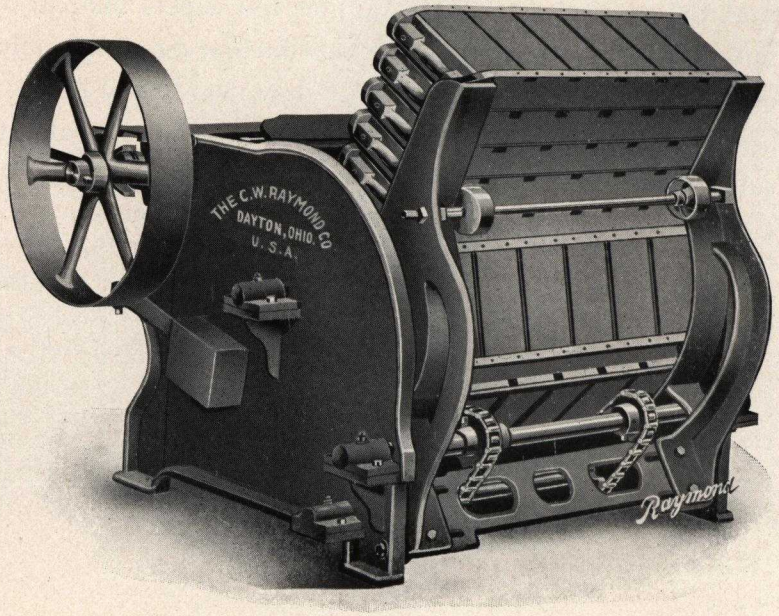
The mold table is similar in construction to that previously described in the Hercules Machines with replacable wearing parts at all possible points which materially reduces the repair expense.

The Raymond Iron Standard Brick Machine is normally fitted with a side discharge pug mill as shown in the illustration. This runs from a separate belt. The size of the pulley on the machine is 36 x 8 inches which runs 16⅔ revolutions to one mold of brick. Size of pulley on pug mill, 36 x 8 inches which runs 8 revolutions to one mold of brick. Capacity, 30,000 to 40,000 brick per day. Approximate weight, complete, 10,000 pounds.



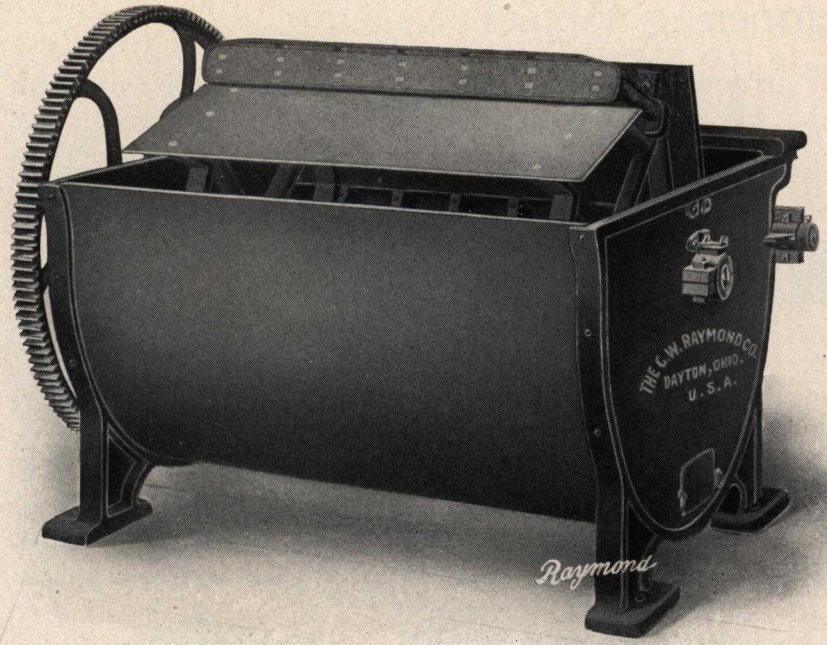
The Raymond No. 1 Mold Sander.

THE No. 1 Mold Sander is of the chain type and is built of all iron and steel. It will feed any size mold by simply changing the mold slides. It can be changed from right to left in a few moments time. The No. 1 style is used more particularly on yards where the pallet system is used. The molds enter the sander through guides and the chains hold them against the pulleys taking them through the machine, discharging them at the top ready for the brick machine.



The Raymond No. 2 Mold Sander.

THE No. 2 Mold Sander is similar to the No. 1 with the exception that the guides extend around the pulleys and the molds are fed in automatically and are placed on the machine several at a time. Either the No. 1 or No. 2 Mold Sander can be readily changed to the other at a small expense. This is very satisfactory where the open yard drying system is used as six molds can be placed on the machine at once. Its operation is the same as the No. 1 Sander.

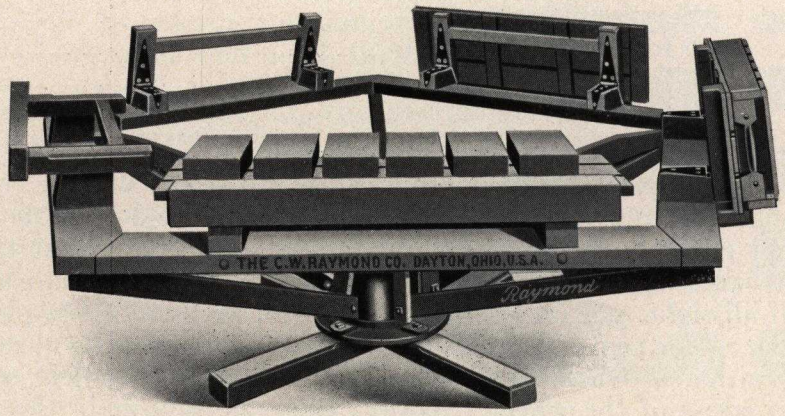


The Raymond No. 3 Mold Sander.

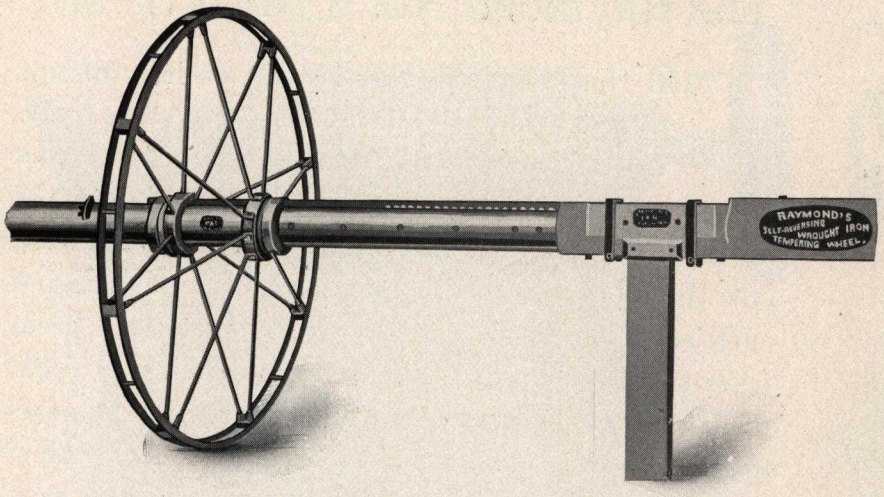
THE No. 3 Mold Sander is built entirely of iron and steel and is of the spider type. The molds are held in position by the arms of the spider and the flat plates dump the sand into the molds so that they are thoroughly coated. On coming out, the mold is turned completely over and the sand emptied. This style of Sander has met with great favor on many yards, there being no chains or belts, the spider being driven positively by gears and no parts to give trouble. It is fitted with a spiral clutch pulley 16 inches by 3 inches which makes 3 revolutions for each mold sanded. In ordering, state whether right or left hand machine is wanted.

The Raymond Dump Table.

THE Raymond Dump Table is used for dumping brick onto the pallets. This is set convenient to the machine and always presents a pallet to the brick machine man so he is not delayed in dumping. It is simple in construction and is fitted with a pivot bearing, dust proof stand. It is well braced and has no complicated parts to wear or give trouble. It is made, as may be desired, with four or five leaves.



The Raymond Tempering Wheel.



TEMPERING is the foundation of all future work upon the brick, hence, well-tempered clay must be of the first importance to the brick-maker.

This Wrought Iron Wheel represents a combination of mixing and tempering parts not found in any other machine or wheel. Besides working the mud between the tires, there are sixteen spokes performing a like office of tempering and a pit of mud containing 10,000 bricks, operated upon for about one hour, is ready for the work of the molder. As a mixer for all kinds of clay, the Wrought Iron Wheel is without an equal. By its use perfect tempering is always assured.

The Wrought Iron Wheel is operated in a pit by either steam or horse power. By an automatic arrangement of the rod and pinion the Wheel is drawn back and forth on the shaft, changing its position with each revolution, and reversing itself both at the outer and inner edge of the pit. It consists of a wheel, shaft, rod, pinion, mud bands, post plates, spikes, etc., for operating four pits.

The following sizes and weights are standard. Special weights made to order. The 6 foot Wheel is always sent when no other size is ordered.

Size:	Approximate Weight
6 foot wheel, complete	650 pounds
6 foot, 6 inch wheel, complete	700 pounds
7 foot wheel, complete	750 pounds

SETTING UP AND OPERATING TEMPERING WHEEL.

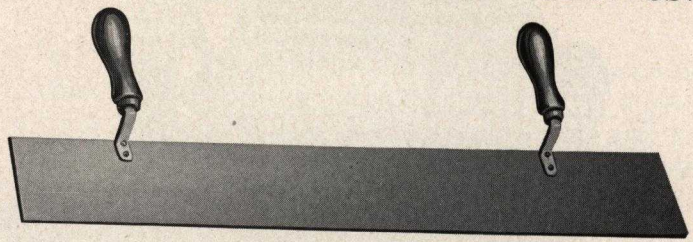
Remove the lid, clamps, and wheel-stop; slip the rod out to the pointed end of the shaft and put both rod and shaft through the hub of the wheel until the notched part of the rod sets firmly up against the pinion head. Put the wheel-stop on exactly where it came off. Grease all wearing parts well with clean lard and try it in an empty pit. If all right, put on the clamps and lid, and you are ready for a season's work. See that the center post is of sufficient height that the shaft will set exactly or nearly level when in position to work. Do not allow the center to collect too much mud, as it impairs the progress of the wheel. Always keep the groove in the shaft clean, in order that the rod may slip freely and perform its work without hindrance.

Construction of Pit.

Diameter of Pit for 6 foot Wheel.....18 feet 6 inches
Diameter of Pit for 6 foot 6 inch Wheel.....19 feet
Diameter of Pit for 7 foot Wheel.....19 feet 6 inches

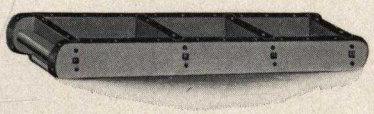
Throw out all the dirt to the depth of 18 inches. Plant a center post firmly in the ground, the braces not to extend over 18 inches either way from the post. The size of post 8 by 8 oak or the butt of a small tree. Lay a floor of 1 inch boards in the bottom, leaving the ends extend into the bank or sides to hold them in place. Saw off center post, for 6 foot wheel, 2 feet 8 inches; for 6 foot 6 inch wheel, 2 feet 11 inches; for 7 foot wheel, 3 feet 2½ inches above the floor of the pit.

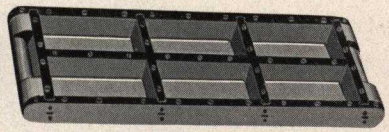
The Raymond Strike Knives.



The Raymond Strike Knives are made of the best grade of saw steel and of sufficient length so the whole mold can be struck off with one movement. This material has proven to be the best for the purpose and will greatly outlast any other.

Brick Molds.

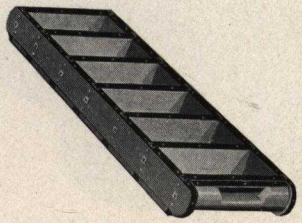




THE Raymond Brick Molds are made of the very best quality of cherry wood, the side pieces are ¾ inch thick, partition and bottom $\frac{9}{16}$ inch and bound with No. 12 steel extending entirely around the mold. In ordering machine molds, invariably give the exact size of the molded brick, number of bricks in each mold, thickness of partition and the total length of the mold.

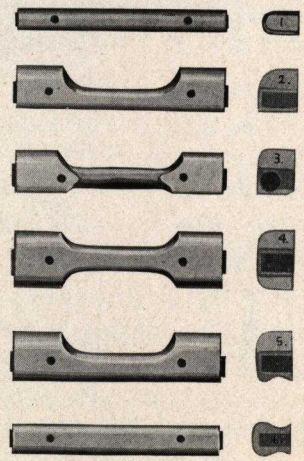
The Raymond Hand Molds are made with side pieces $\frac{13}{16}$ of an inch thick, partition ¾ of an inch thick, bottom $\frac{9}{16}$ of an inch thick. They are bound with No. 12 steel and are made for two brick, three brick, four brick and six brick.

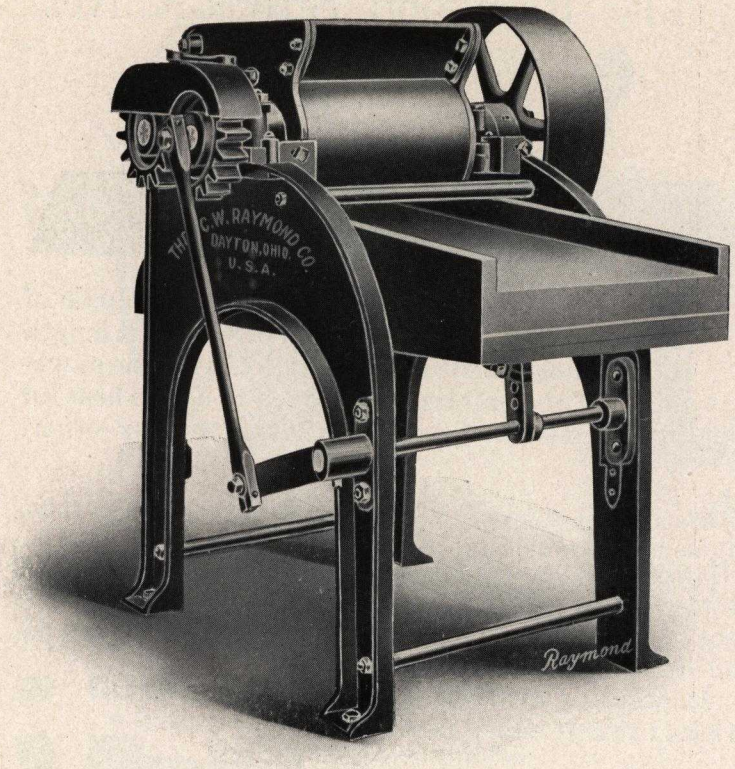
We can also furnish shape molds to make any of the fire brick shapes in common use, and within the range of the machines. Hand molds can be made as desired. These molds are always special and made to suit requirements.



In ordering molds it is advisable that you invariably furnish us the number of the style handle desired as shown in the illustration. In case no shape is specified, we will use our own judgment in furnishing the style.

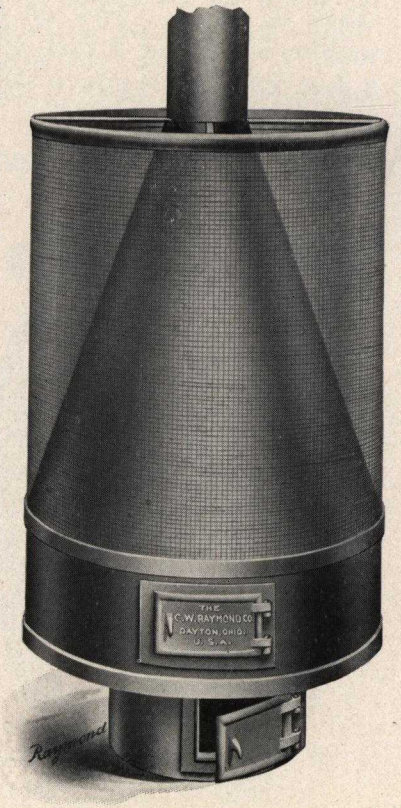
We can also furnish a mold made of walnut, maple, poplar, beech or pine, the construction, however, will be substantially the same as our standard molds.





The Raymond Sand Crusher and Sifter.

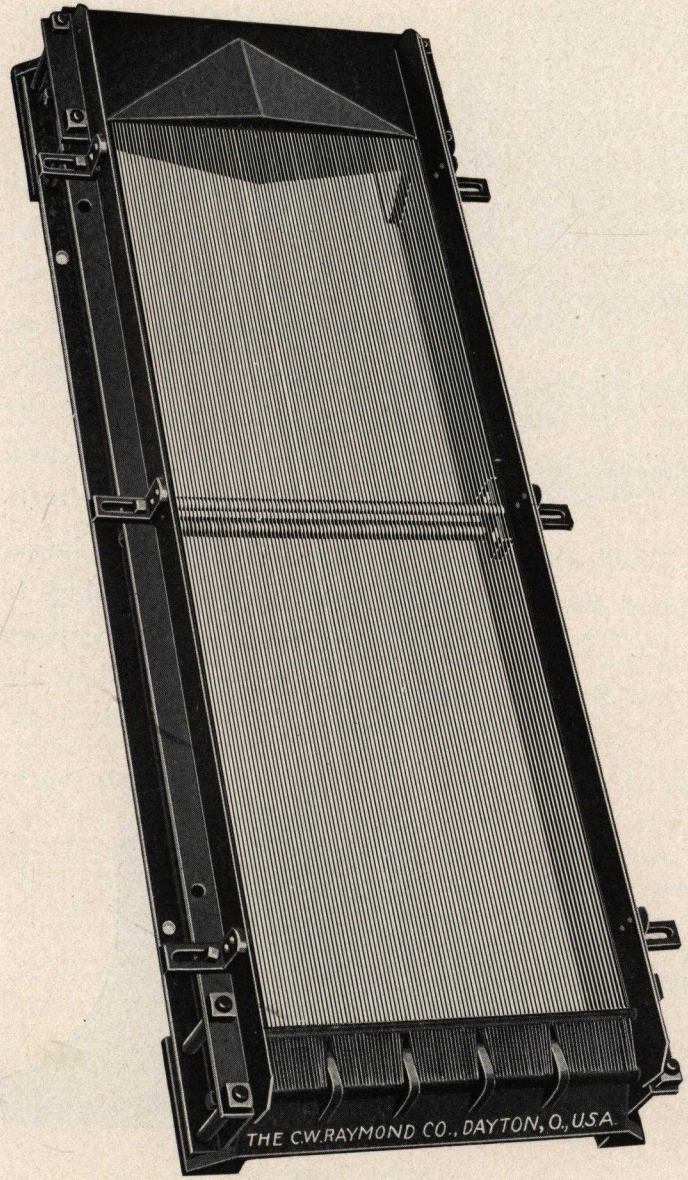
THE Raymond Sand Crusher and Sifter is built of all iron except the screen shoe. The shafts are of steel. The rolls are turned to run true. The boxes are babbitted, and those on one roll are arranged to adjust so that the operator can grind the sand to any desired fineness. The rolls are geared together, giving each a positive drive. The screen shoe is so arranged that the screens may be instantly changed to any size of mesh desired. The shoe is driven direct from the rolls with changeable movement. The screened sand may be discharged into a wheelbarrow at the front end of the sifter, while the tailings are discharged at the opposite end. The pulley is arranged with clutch for stopping and starting at the will of the operator. Capacity, one car load in ten hours. Size of rolls, 8 inches diameter and 20 inches long. Height, 45 inches to top of hopper. Approximate weight, 1,000 pounds. Size of screen, 18 inches by 36 inches.



The Raymond Improved Sand Dryer.

THE Raymond Improved Sand Dryer is constructed of a conical stove fitted with an outside screen which can be of any mesh. This extends entirely around the fire box and is provided with an opening for taking out the sand. The Dryer is complete in itself, requiring only the necessary pipe and supports as the ash pit is made a part of the stove.

It is built of iron throughout and very heavy in all of its parts.



The Raymond No. 2 Piano Wire Screen.

The Raymond Piano Wire Screens.

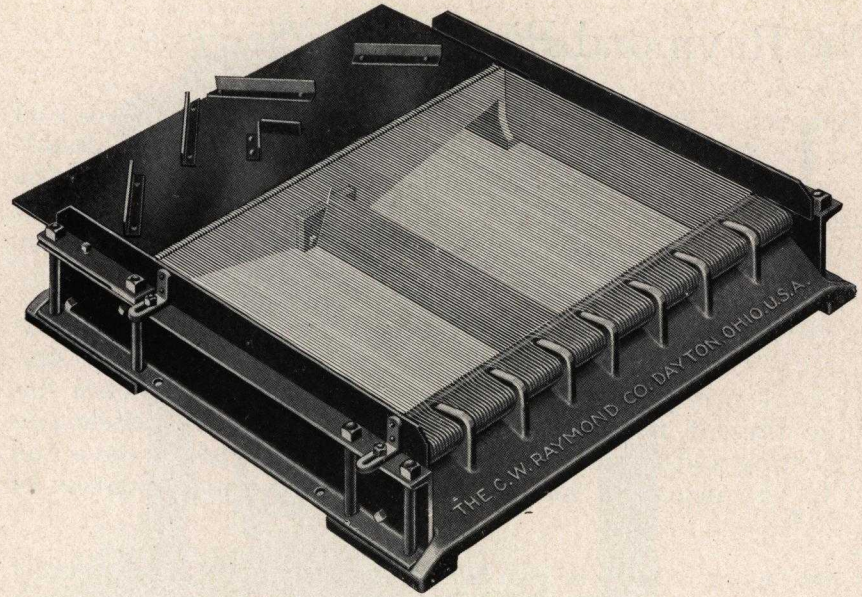
THE success of the Piano Wire Screen has fully demonstrated that its principle is correct beyond any question of doubt. It operates by gravity, eliminating cost for running, and the wires are strung from end to end of the frame work without cross wires, allowing the material to pass through with least resistance, admitting a much greater capacity.

The construction of the Raymond Piano Wire Screens is an appreciable departure from the usual, incorporating many features of simplicity and more nearly approaching perfection. Our experience has produced the present machine which overcomes all the deficiencies heretofore existing and is universal in its use for all kinds of clays and shales and to any degree of fineness required in the manipulation of these materials.

The frame work is built of two heavy steel channels, held securely at the ends by the key and loop boards and tied in the center by a stretcher. The key board contains a series of tightening keys made especially for this purpose and accurately fitted into tapered holes. A slight turn of the key tightens the wire to any desired tension, and is held from backing by a lock nut underneath. A clear idea of this construction may be had from the sectional illustration.

The loop board has a similar construction to the key board except that it contains a heavy steel bar around which the wires loop. Both boards are grooved at the upper end for the spacing bars which are held in place by the tension of the wires over them. These spacing bars determine the number of wires to the inch, or mesh of the screen, and can be made as desired.

To prevent undue vibration of the wires and a possibility of tailings passing through, there is a third spacing bar midway between the ends. This bar is set about 1/8 of an inch higher than the other two in order that the tension of the wires will hold them in the grooves provided. The



The Raymond No. 3 Piano Wire Screen.

screen is fitted with steel sides boards, distributing, and tail plates.

In order to obtain the extremely fine screening required for dry press work, ornamental and fine faced brick, we have designed the No. 3 and 4 Piano Wire Screens which are of shorter wire but wider. This admits of the use of much smaller wire, and, consequently, closer spacing.

The spreading board is provided with lugs so set as to spread the material evenly over the surface of the screen thus giving it its highest efficiency, and, on account of the extra length of the key and loop boards, they are braced to each other giving great rigidity to this type of screen.

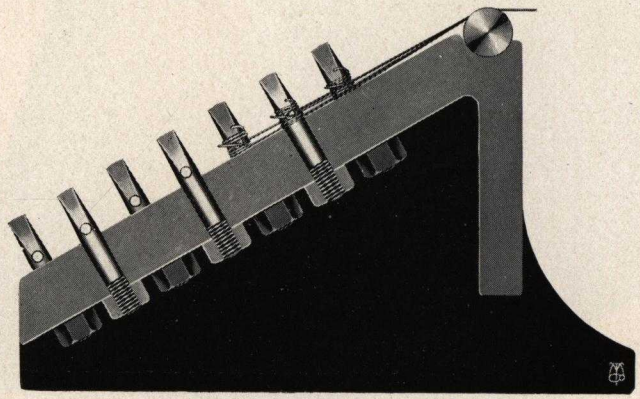
The side boards are adjustable so that they can be set tight against the wires allowing no space for tailings to get through. In either type of screen it is not necessary to use special wires as these can be cut direct from the coil, slightly over twice the length of the screen. They are then looped around the loop bar and both ends inserted in the key.

The actual screening surface of the No. 1 is 24 inches by 48 inches and contains 8 square feet of surface.

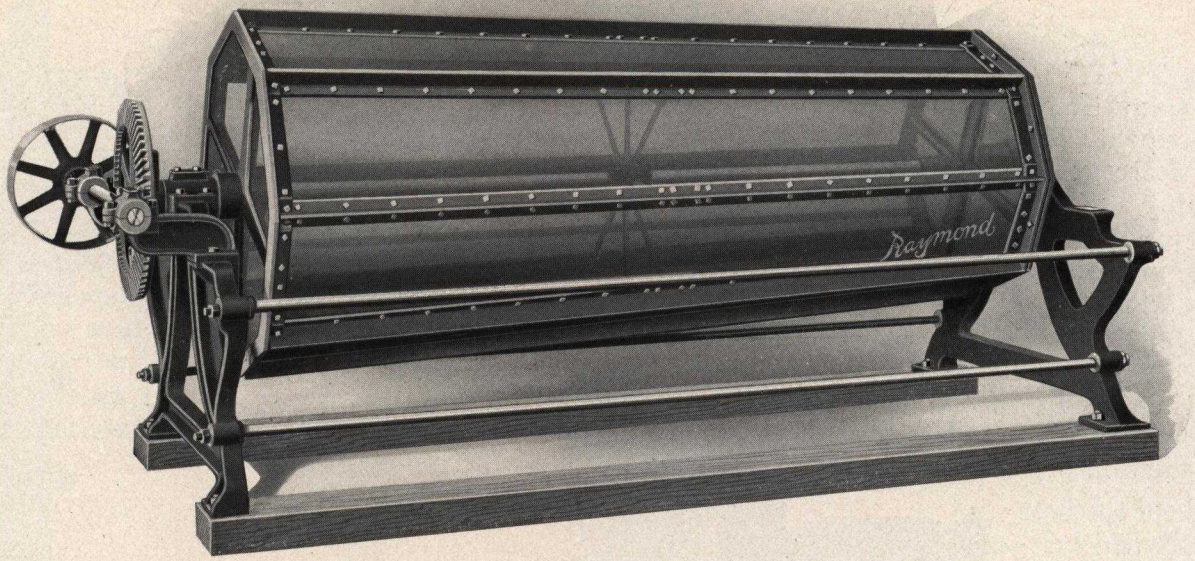
The actual screening surface of the No. 2 is 24 inches by 60 inches and contains 10 feet square of surface.

The actual screening surface of the No. 3 is 42 inches by 33 inches and contains approximately 10 square feet of surface.

The actual screening surface of the No. 4 is 42 inches by 52 inches and contains 15 square feet of surface.



Section Through Keyboard.



The Raymond Revolving Screen.

THE desire of many screen users for a revolving screen has led us to re-design our machine, constructing it entirely of iron and steel excepting the skids. It is built up of heavy end frames thoroughly supporting the entire mechanism and is of sufficient ruggedness to withstand the vibration to which the screen is subjected. The main frame work of the screen proper consists of two iron heads separated by iron bars. These bars are braced in the middle by a spider which adds to their rigidity. The screening plates are fastened to these bars by means of iron plates and bolts. The screens may be either of perforated metal or woven wire and of any mesh desired, from the extremely fine to the very coarse. The inner surface of the screen or cylinder is practically smooth, presenting no obstacle in the path of the material which would obstruct its passage in any manner. The screen plates are readily replacable when worn or can be changed to a different mesh or gauge with but little trouble. The bevel gearing is placed at the discharge end instead of at the receiving end so that the material does not fall on it and cause undue wear and cutting out.

The screen is 9 feet long and 40 inches in diameter and mounted on a steel shaft $2\frac{7}{16}$ inches in diameter. It is driven by a pulley 18 x 8 inches which should run 75 R. P. M. The capacity depends on the size of mesh used. Approximate weight, 2,500 pounds.

We can also furnish fixtures independent from the frame to meet special conditions. These fixtures consist of the screening cylinder and shaft, four babbitted plain boxes, bevel gears, driving pulley and shaft, and two set collars.

Gravity Screening Plates.

We are prepared to furnish Gravity Screening Plates of any desired mesh either of perforated steel, iron or woven wire cloth.

The Raymond Belt Conveyor.

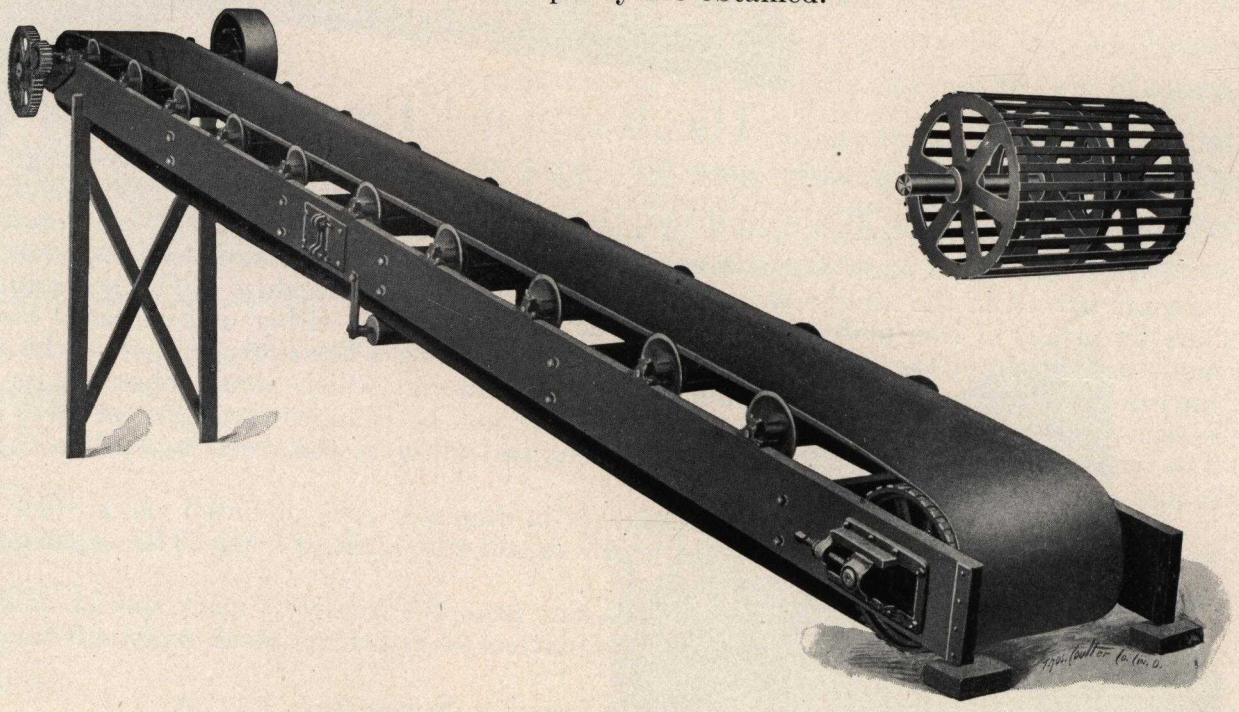
THE fact is many times overlooked that a belt conveyor is worth serious consideration, however, it is true that the requirements of conveyors are as exacting as any other part of the clayworking plant, as a conveyor out of order, destroys the continuity of the operation of the machinery, equally as much as a brick machine or dry pan.

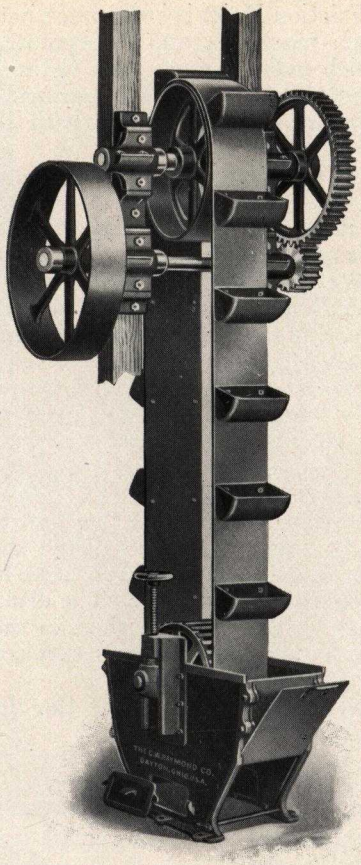
The Conveyor we build is constructed of sides 12 inch by 2 inch Norway pine, connected at proper intervals with braces of like material and bolts running through and through. The rollers have a 7/8 inch steel journal, turned. The large flanges which support the sides of the belt form part of the roller, but revolve independent from it, consequently, at every point the belt is brought in contact with the rollers, it meets an anti friction or revolving surface which minimizes its wear. Each separate journal travels in a box which is provided with a cap and oil cup.

An interesting feature of the conveyor is the slatted drum at the lower end around which the belt revolves. This actually prevents the accumulation of the falling clay around the drum, the collecting material dropping through; also, by this construction better adhesive qualities of the belt to the pulley are obtained.

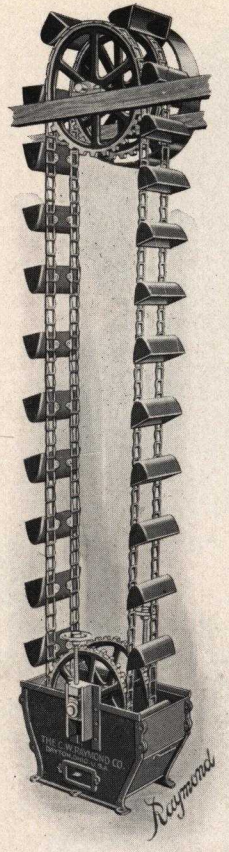
The belt is made of the best grade of cotton stitched belting with hinged sides, giving it a concave or trough shape as it passes over the beveled flanged rollers thereby preventing the material from falling out or over the sides. This belt is especially made for the purpose. Take up boxes are provided whereby the belt can be kept at proper tension at all times.

The Raymond Belt Conveyors are made of any length and in 10 inch, 12 inch, 14 inch, 16 inch, 18 inch, 20 inch, 22 inch and 24 inch widths. The driving pulley is 24 inches diameter by 8 inches face and should run 100 R. P. M.

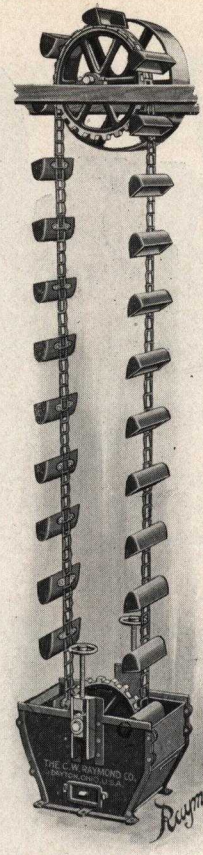




Belt Type.



Double Strand Type.



Single Strand Type

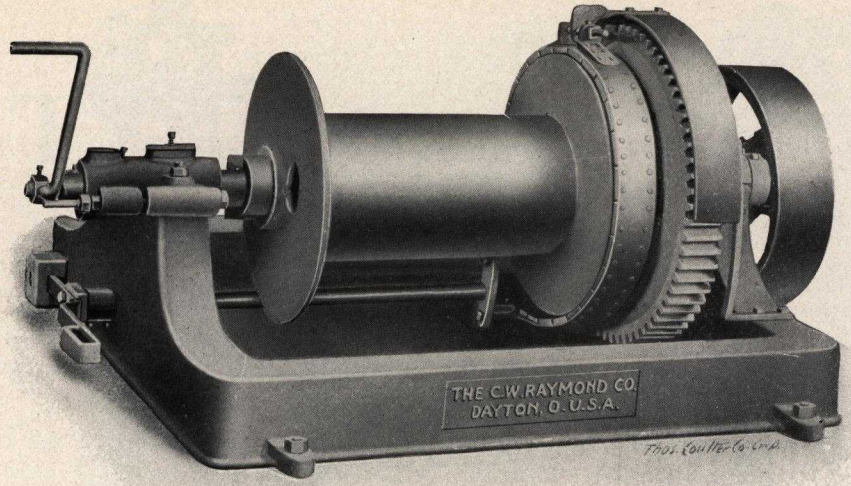
The Raymond Cup Elevator Fixtures.

WE MANUFACTURE these elevators in three styles, the first of which is the belt type and most common form in use around brick plants. They consist of the boot, belt, buckets, boxes, pulleys, shafts and gears. The most interesting point is the design of the boot which is not only sufficiently strong for the purpose but provided with large openings on the side as well as being fitted with slide end which can be opened its entire width, allowing perfect cleaning or for the removal of any foreign substance. The slatted drum shown is not regularly furnished but it is advisable to use one in the case of sticky clay as it prevents the building up of the clay on the pulleys, causing the belt to run out of line.

The Raymond Chain Type Elevator has found favor in many places and the fixtures consist of one boot, sprocket wheels, upper bearings, shaft, pulley and sufficient chain for the required height. The single chain type is large enough for the smaller size buckets but in case the larger ones are used, we recommend the double strand type.

The driving pulleys are 24 inches in diameter by 6 inches face and should run 150 R. P. M.

The Raymond Gear and Friction Hoist.



Spur Geared.

THE Raymond Gear and Friction Hoist is built much better than is usual with such machines, and incorporates a number of features which make it more than ordinarily desirable and convenient to operate. All bearings are self-oiling, providing ample lubrication at all times, with only casual attention.

The base is a solid casting of heavy grey iron, giving perfect rigidity to the entire machine.

The drum is a one piece casting of ample proportions for the effective operation of long length hauls.

The friction surface is greater and more powerful, and the brake band wider than any other Drum of its weight, providing for maximum tractive power and making complete control of the empty cars down the incline easy and sure. The weight of the brake band, while not operative, is sustained by a simple bracket support, which not only avoids unnecessary wear upon the lining, but permits the easy starting of the empty cars while yet on a level.

The machine operates as follows:

The gear is attached to the drum shaft and has firmly wedged into a deep groove in it, a ring of hard wood, which is the shape of the frustrum of a cone. This ring of wood, securely held by a bolt in each segment, is easily replaced when worn. The drum is loose upon the shaft and has in one end of it, a depression of the same shape as the friction ring referred to above. When it is desired to make the drum operative, it is forced into contact with the friction ring by means of a screw provided with a crank handle which passes through a heavy thrust nut attached to the frame.

Around the shaft, between the gear and the drum, is a powerful spiral spring, which, when the screw is turned backward disengages the drum from the gear, leaving the former stationary while the latter continues to revolve.

The brake band is lined with sectional hard wood blocks, and made in two pieces connected at one end with a take-up bolt, and at the other by means of a bell crank mounted upon a rock shaft to a foot lever shown in the cut. The brake is automatically released by a weight attached to the other end of the foot lever. The purpose of this brake is to control the speed of the empty cars returning down the incline or to hold the loaded cars stationary at some point during their ascent.

This Hoist is built either spur or bevel geared, and with two size drums.

SPECIFICATIONS.

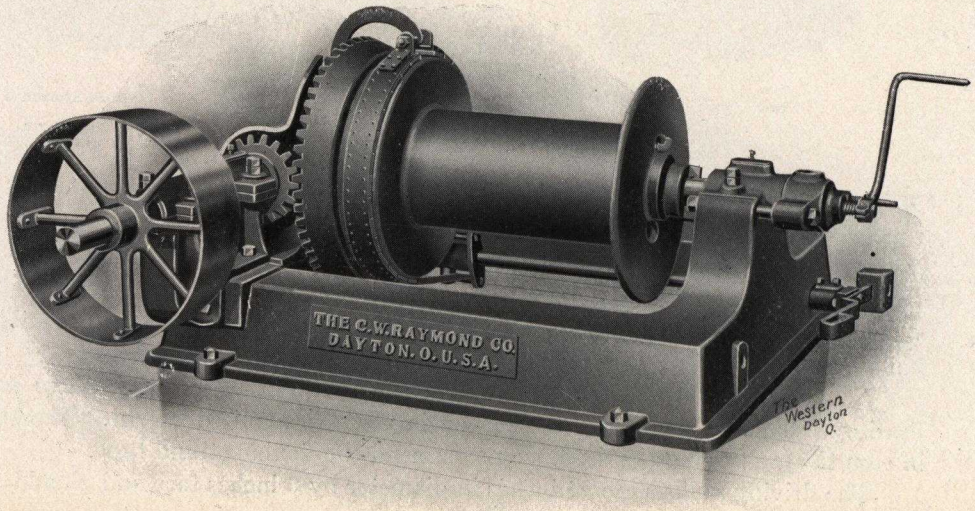
Drums—12 inches diameter, 24 inches face. 18 inches diameter, 24 inches face.

Frame—5 feet long by 6 feet, 9 inches wide.

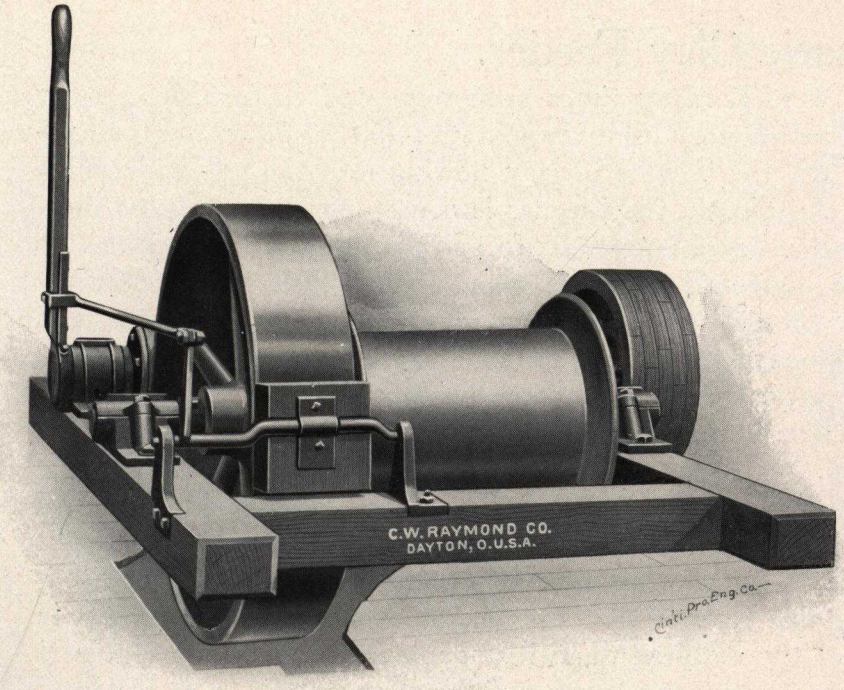
Pulley—Spur geared, 30 inches diameter by 8 inches face. Bevel Geared, 30 inches diameter by 10 inches face.

Speed—Spur Geared, 300 R. P. M. Bevel Geared, 150 R. P. M.

Approximate weight, 2600 pounds.



Bevel Geared.



Winding Drum.

The Raymond Self-Contained Winding Drums.

THE Self-contained Winding Drums are strongly constructed on substantial oak frames. They are furnished complete, as shown, ready to set up in any position desired. The main shaft, to which the drum is keyed, is plentifully large for the work required of it. The driving shaft is proportionately strong.

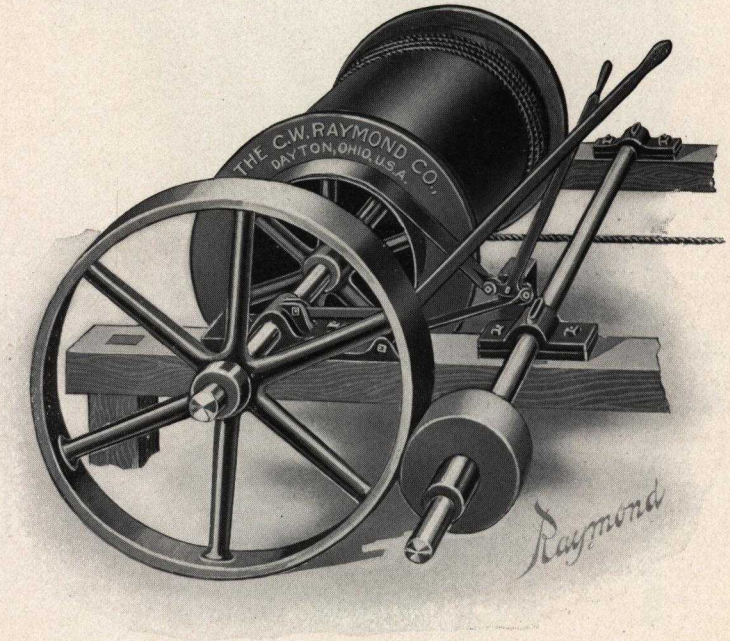
The driving shaft is in continuous motion and to make the drum operative, the paper friction is pressed firmly against the large friction wheel by means of the lever. A reverse motion of the lever or handle releases the friction and at the same moment applies the brake.

This machine is built with a standard size drum, sixteen inches diameter, twenty inches face, although other sizes can be furnished. It is also built with bevel gears for use when the track is parallel with the line shaft.

We can also furnish a set of fixtures consisting of the standard size drum, main friction pulley and paper friction, together with the necessary boxes and brake when it is desirable to attach the apparatus direct to the line shaft, in which case the paper friction pulley is placed on the line shaft and the drum and fixtures located accordingly.

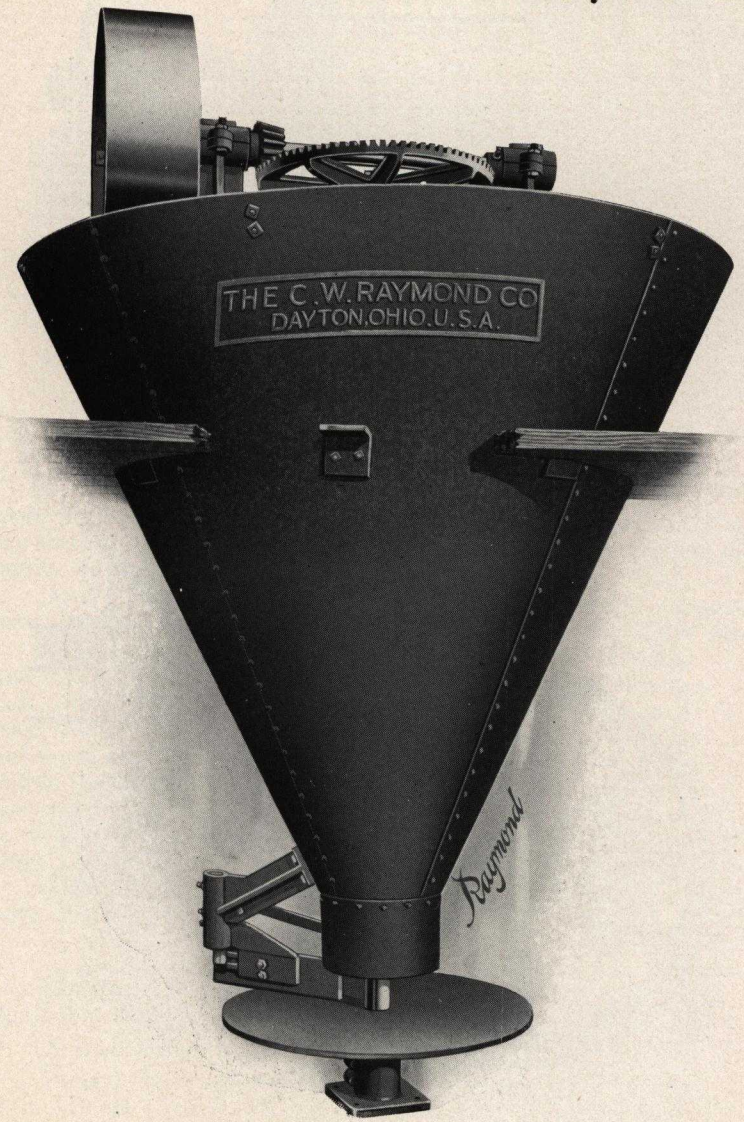
Size pulley for the straight geared drum is 30 inches diameter, 6 inches face, running 150 R. P. M., Approximate weight 1700 pounds.

Size pulley for the bevel geared drum is 20 inches diameter, 6 inches face, running 300 R. P. M. Approximate weight 1900 pounds.



Winding Drum Fixtures.

The Raymond Automatic Clay Feeder.



WE HAVE many times been requested to furnish a really satisfactory feeding apparatus that would correctly measure the volume of clay flowing into the pug mill. Our Automatic Clay feeder is constructed regularly as illustrated, with a steel hopper six feet in diameter at the top, twelve inches in diameter at the bottom, and six feet high. Securely bolted to the top of the hopper is a rigid frame work of steel and iron, supporting the driving mechanism for the vertical disc shaft. On this vertical shaft and about five inches below the hopper is a cast iron disc 40 inches in diameter, supported by a collar and held by a key.

At the lower end of the vertical shaft is a small step bearing, carrying the weight of the shaft, disc, bevel gear and the weight of the clay resting on the disc. On the upper surface of this disc is an adjustable scraper that can be set in any desired position in order that the required quantity of material can be fed regularly and automatically into the pug mill.

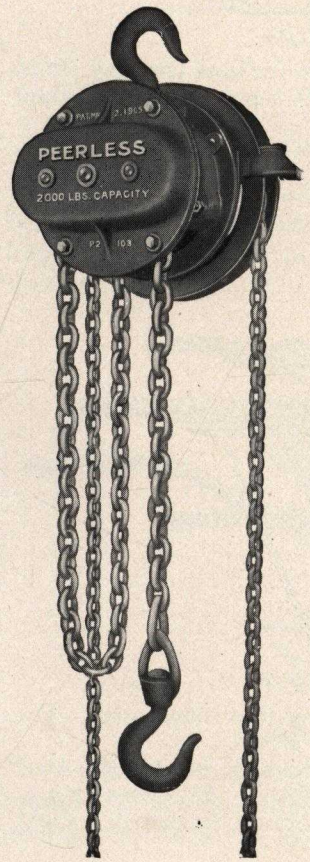
Our automatic feeder has been thoroughly tried out, and has demonstrated to the utmost degree of satisfaction that it will correctly measure any desired volume of clay, and with its adjustable feature, by which this quantity can be changed at will, we have an apparatus which fills a long felt want in many brick plants. The machine is usually set above the pug mill, and feeds directly into it. In case it is desired, we can furnish the measuring and feeding mechanism without the hopper, all of which can be attached to a wooden hopper already constructed.

The principal dimensions are nine feet four inches high and six feet in diameter. Approximate weight 1500 pounds. It is furnished with a plain pulley twenty-four inches in diameter and six inches face, which should run 104 R. P. M.

Chain Hoists.

EVERY brick manufacturer should include a Hoist in his equipment as it is invaluable on many occasions, saving the labor of from two to ten men and eliminating the danger attending the handling of heavy pieces. They will save in the erection of a plant three or four times their cost, as well as greatly facilitate the work.

We illustrate two styles, one of the screw type and the other the Peerless spur geared. We are also prepared to furnish trolleys which, in connection with a small hoist, are wonderfully convenient over the front of the brick machine when it it necessary to often change the die.

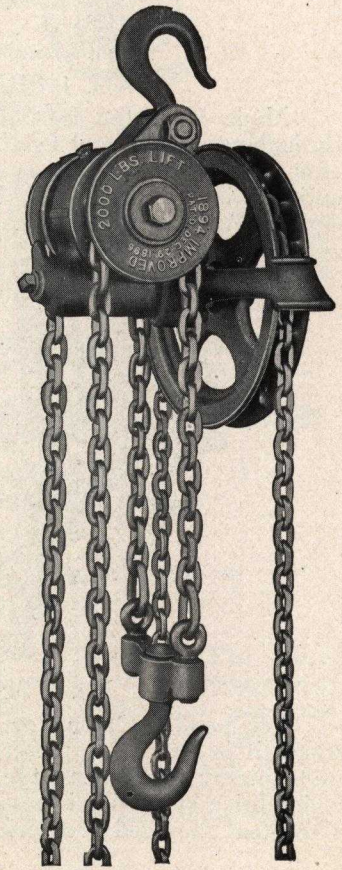


Data on Screw Hoists.

Capacity in pounds	Regular Lift	Gross Weight of Hoist
500	8 feet	61 pounds
1000	8 feet	97 pounds
2000	8 feet	103 pounds
3000	8 feet	144 pounds
4000	9 feet	215 pounds
6000	10 feet	324 pounds
8000	10 feet	419 pounds
10000	12 feet	620 pounds
12000	12 feet	760 pounds
16000	12 feet	886 pounds
20000	12 feet	972 pounds
30000	12 feet	1451 pounds

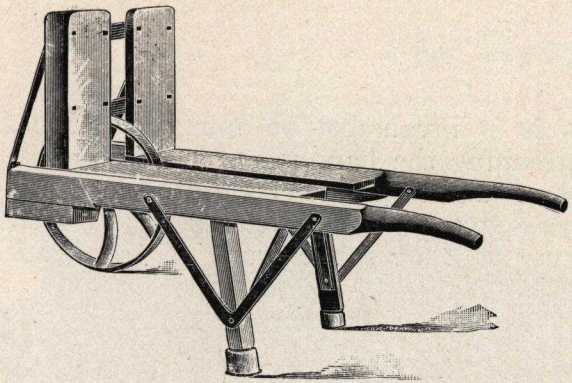
Data on Peerless Hoists.

Capacity in pounds	Regular Lift	Gross Weight of Hoist
500	8 feet	65 pounds
1000	8 feet	72 pounds
2000	8 feet	100 pounds
3000	8 feet	147 pounds
4000	9 feet	202 pounds
6000	10 feet	301 pounds
8000	10 feet	292 pounds
10000	12 feet	425 pounds
12000	12 feet	440 pounds
16000	12 feet	559 pounds
20000	12 feet	640 pounds
30000	12 feet	1290 pounds



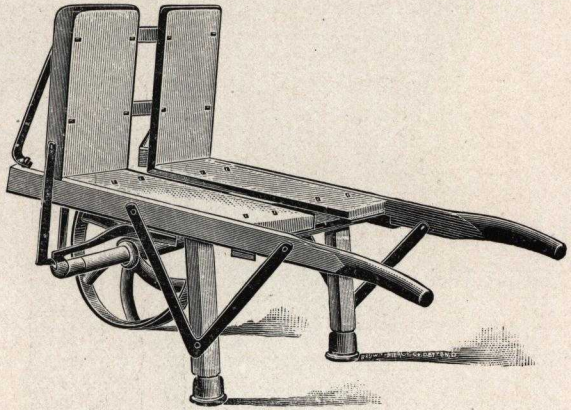
The Raymond Barrows and Trucks.

Any Barrow or Truck can be fitted with roller bearings if so wanted.



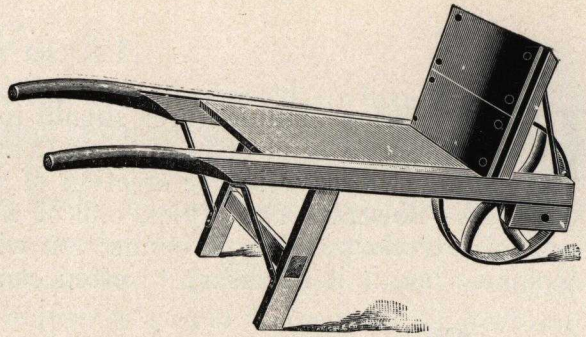
NO. 1 BRICK BARROW.

Made from the best seasoned white oak. Frame mortised throughout. Legs and front braced and cross-braced underneath. Iron wheel and axle. It is so adjusted that the wheel carries the entire weight of the load. For strength and durability it has no equal. Weight, 89 pounds.



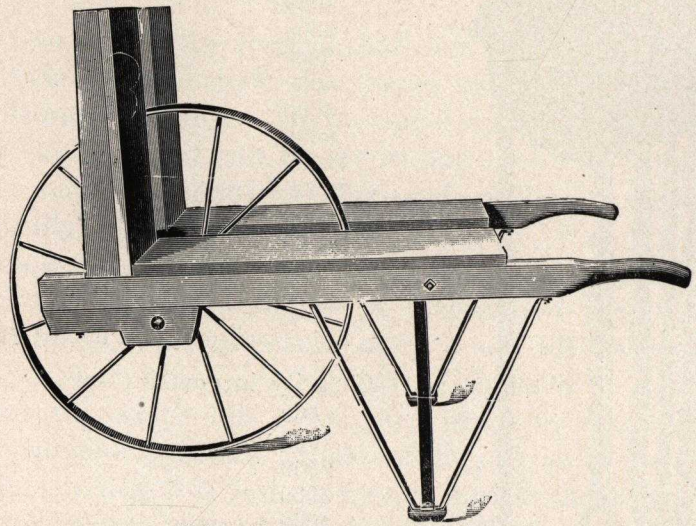
No. 2 SPRING BARROW.

For handling green or re-pressed brick. For pressed brick where it is desired to preserve the fruits of re-pressing, we would undoubtedly recommend the Spring Barrow, as the danger of defacing brick by jarring is obviated. Iron wheels, axles and bearings. Three-leaf tempered steel springs. Very durable. Weight, 110 pounds.



NO. 3 CLAY BARROW.

Intended for wheeling clay. It has an inclined front by which the load is brought well over the wheel. Is short and wide. Built very strong. Weight, 87 pounds.



NO. 12 BRICK BARROW.

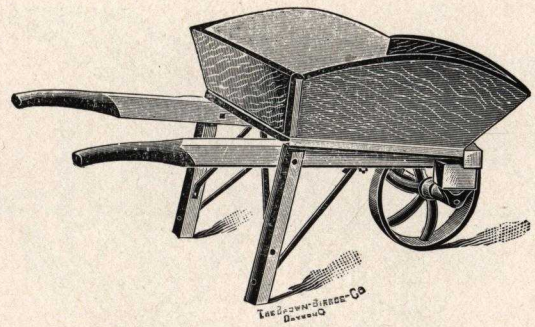
This barrow is taking the lead wherever it is introduced. The wheel being large it runs and balances very easily.

Wheel 30 inches high by 2 inch tread, made of wrought steel with turned axle. Dash 20 x 20 inches; Bottom, 28 inches long.

We furnish these barrows with anti-friction bearings at a slight advance in price.

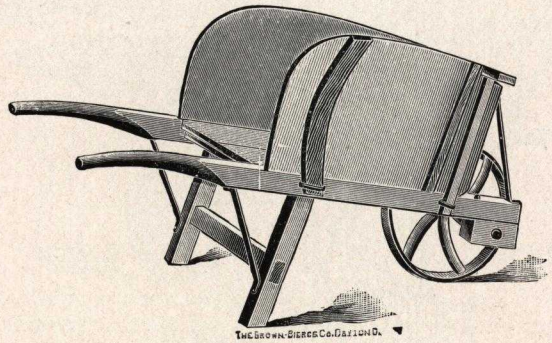
The Raymond Barrows and Trucks.

Any Barrow or Truck can be fitted with roller bearings if so wanted.



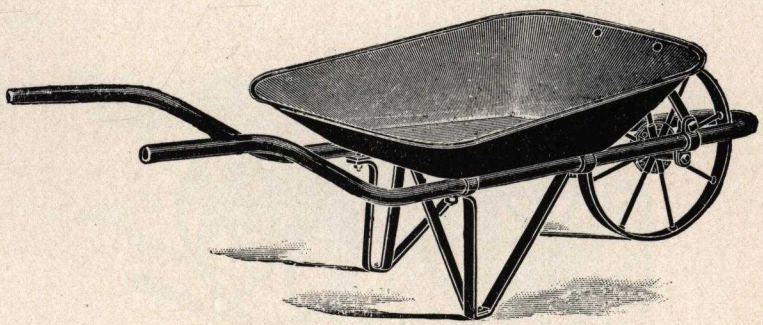
NO. 4 DRY DIRT OR SAND BARROW.

For dry dirt or sand. We make a much stronger barrow for this use than is ordinarily sold. This Barrow is well braced and ironed on top. Will furnish with steel tray when so desired. Weight, 80 pounds.



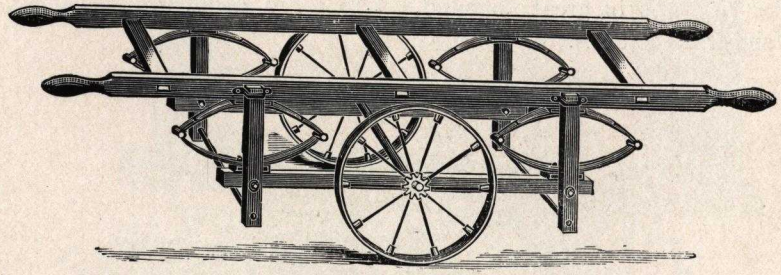
NO. 5 SIDE-BOARD BARROW.

This Barrow is substantially built, thoroughly braced, and well painted. It can be used either with or without the side-boards. It is a convenient Barrow for general use around the yard. Weight, 110 pounds.



SAND OR ASH BARROW.

An all metal barrow substantially built and one of the most convenient, general purpose barrows around the yard. Being of iron, it will handle hot ashes without danger of burning.

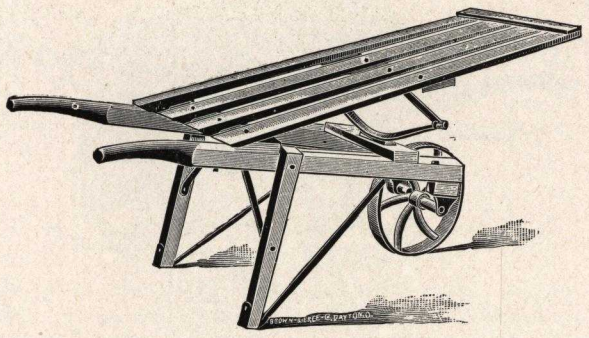


NO. 0 OFF BEARING TRUCK.

The Truck, No. 0, here shown is very popular. The entire load is nicely balanced on two wheels. It can be wheeled from either end, hence one boy with this truck can do the work of two men with others. With flat top, it makes an excellent truck for the tile yard, or slated is invaluable for use with the dry press. The wheels are iron and work on turned axles. It has four springs. Length, 10 feet; width, 23 inches; height, 28 inches. Approximate weight, 160 pounds.

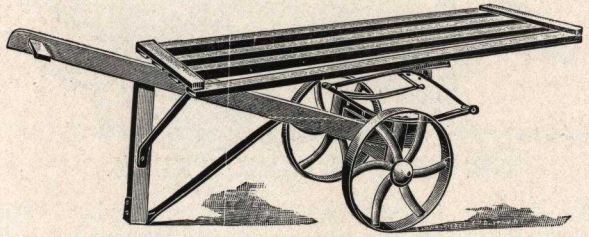
The Raymond Barrows and Trucks.

Any Barrow or Truck can be fitted with roller bearings if so wanted.



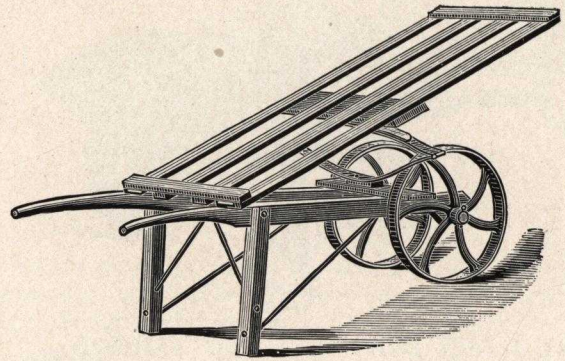
NO. 1 OFF-BEARING TRUCK.

With one wheel and one spring, light and strong, well braced. Iron axle and bearings. Wide tire, and will not cut the yard. Is preferred by many on account of the "barrow" shape of the handles. The No. 1 is in great demand. Will carry six molds or pallets. Weight, 79 pounds.



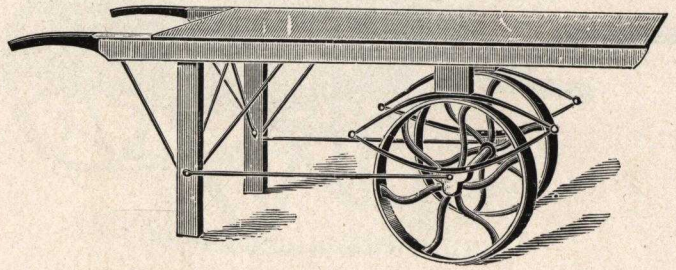
NO. 2 OFF-BEARING TRUCK.

With one handle, two springs and two wheels. A very popular Truck, as it combines special features of the other two. Is comparatively light and convenient to handle. Will carry six molds or pallets. Weight, 103 pounds.



NO. 3 OFF-BEARING TRUCK.

The design here presented maintains the same barrow shape to the handles as No. 1. It has two wheels which operate on turned axles. It is substantially made and well braced. It turns corners quickly, and will not easily upset. Will carry six molds or pallets. Weight, 108 pounds.

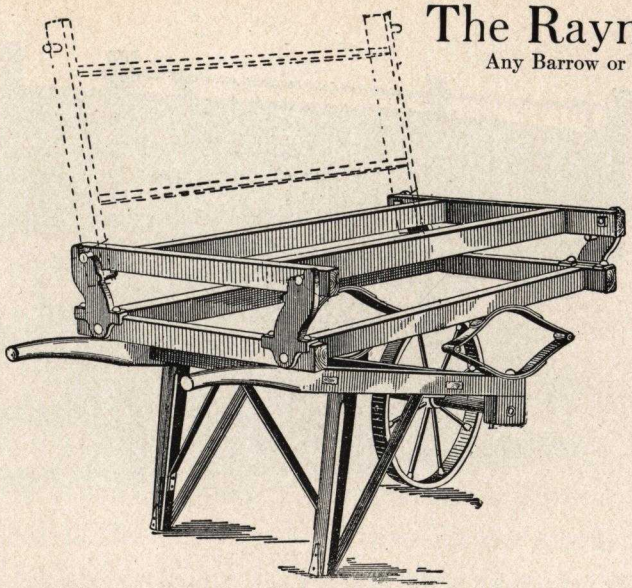


PLATFORM TRUCK.

This Truck is made with or without springs, either with closed top for face brick, as shown, or open for hauling pallets from the machine. It is well built, and runs easy. Weight, 140 pounds.

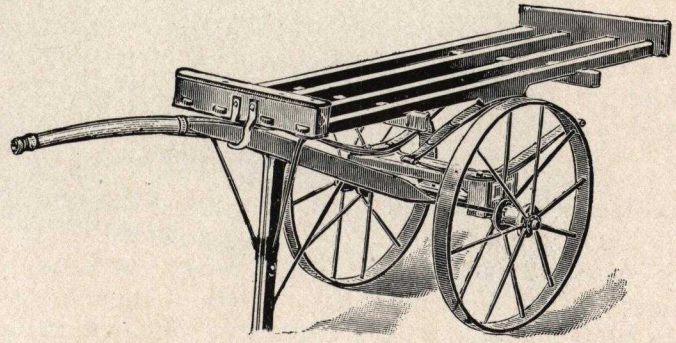
The Raymond Barrows and Trucks.

Any Barrow or Truck can be fitted with roller bearings if so wanted.



THE RAYMOND DOUBLE DECK TRUCK.

This is made with either one or two wheels and will carry ten pallets. The deck raises on either side and can be made for dry press by the addition of the necessary slats. If desired, this truck will be made so the deck turns upon the end. The deck can be lifted off and the truck used as a single deck truck.

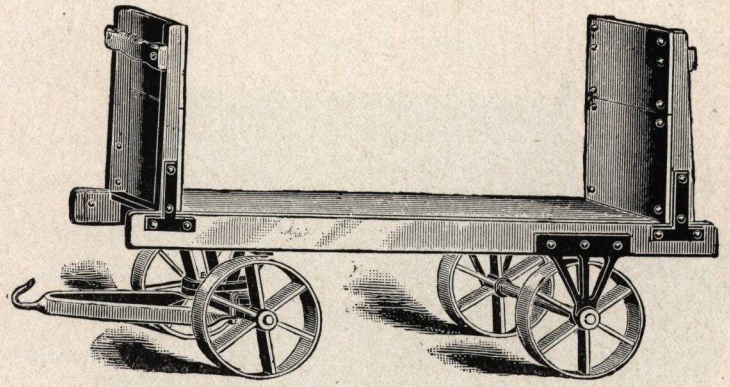


DRY PRESS TRUCKS.

The above truck is handy for most any kind of trucking. It is made strictly of first-class material. Wheels, 26 inches high by 2 inches face, run on turned axles. Platform, 18 inches wide by 56 to 64 inches long. Weight, 115 pounds.

THE RAYMOND DRY PRESS TRUCKS.

This truck is made with a double handle and fitted with substantial springs to take up the jarring, thus preserving the corners and edges.

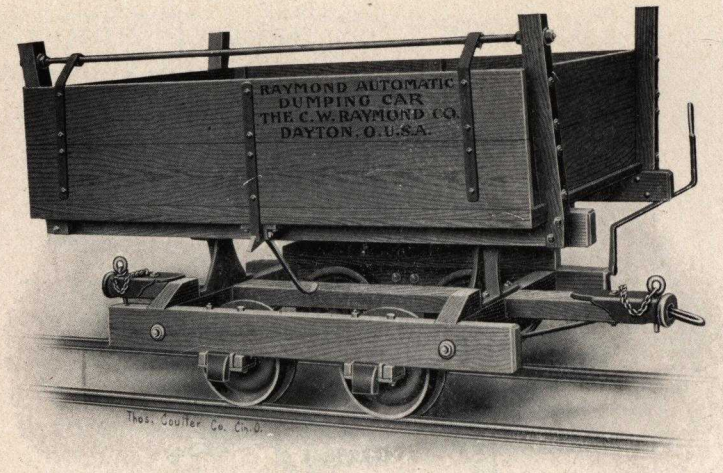


MULE TRUCKS.

For Hauling Dry Bricks from Yard to Kiln.

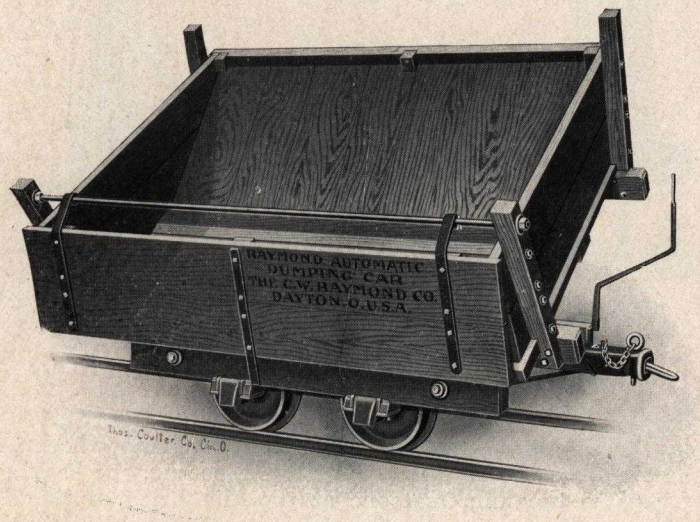
These Trucks are a great improvement over hand wheeling. Three compose one set; one being at the racks loading, one hauling from the yard to the kiln, and one at the kiln being unloaded. Platform, 30 by 78 inches. Wheels, 18 inches high by 4 inches face. Hold 500 bricks each. Weight, 350 pounds.

Raymond Automatic Dumping Cars.



THEY are undeniably the simplest acting and most convenient Cars upon the market. By reason of their peculiar construction the preponderance of the weight is on the dumping side of the pivot bar when loaded and on the reverse when empty. Thus the weight of the load dumps the Car, and the weight of the empty bed returns it to position. It is required only to draw the lever to operate them, or, when convenient, a trip bar placed in the track will accomplish the same result.

The entire frame work is made of selected white oak. The sills of the bed are 3 by 4 inches, and of the truck, 3 by 6 inches. The bed is lined with 1¼ inch oak. The frame work is mortised and bolted in the most rigid manner. The axles are of steel, 2 inches in diameter, having turned bearings, and are run in our improved self-oiling boxes. The wheels are 14 inches high by 4 inches face, and are made of a special mixture of chilled iron. They are lathe bored, and compressed on the axle by a compound screw press, which insures solidity, exactness, and in all, easy running.



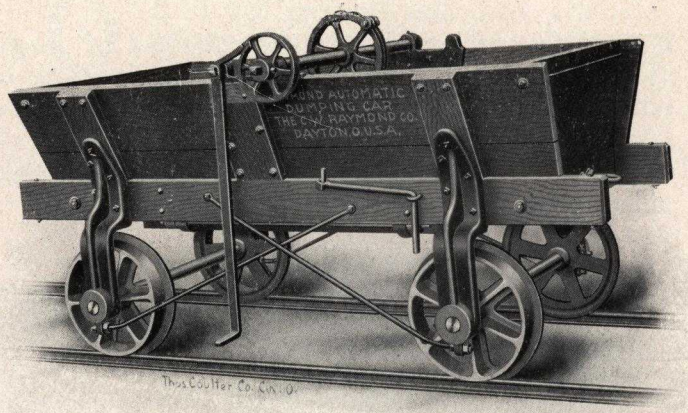
Automatic End Dumping Car.

We manufacture an Automatic End Dumping Car similar in all respects to the side, except its manner of dumping. It is especially adapted to dumping into pug mills, soak pits, and for other brick yard uses. It can be run singly or in trains, and is fitted for operation with the winding drum or teams.

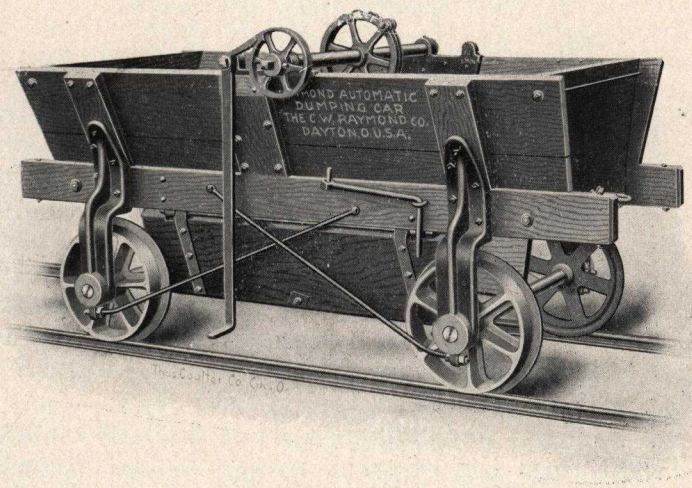
We manufacture these cars in three sizes; 1½ cubic yards capacity; 30 inch gauge; 8 feet 4½ inches long; 5 feet 6½ inches wide; 4 feet 8 inches high. 1¼ cubic yards capacity; 30 inch gauge; 8 feet 3 inches long; 5 feet 6 inches wide; 4 feet 6 inches high. 1 cubic yard capacity; 30 inch gauge; 8 feet long; 5 feet 5½ inches wide; 4 feet 2 inches high. Average approximate weights 1,500 pounds.

The Raymond Bottom Dump Cars.

ONE of the most convenient and practical cars we build is our Bottom Dump, shown in the illustrations. Where it is required to dump the clay between the tracks directly into a Granulator or Disintegrator, this car is the most practical. The load being centered, there is absolutely no strain on the car when dumping. The bottom is divided in the center and hinged on the outer sides. When the car reaches the dumping point at which a trip has previously been placed, the bottom falls, allowing the load to pass between the wheels. It is only required to move the trip bar to discharge the load. After dumping, the bottom is reset.



Bottom Closed.

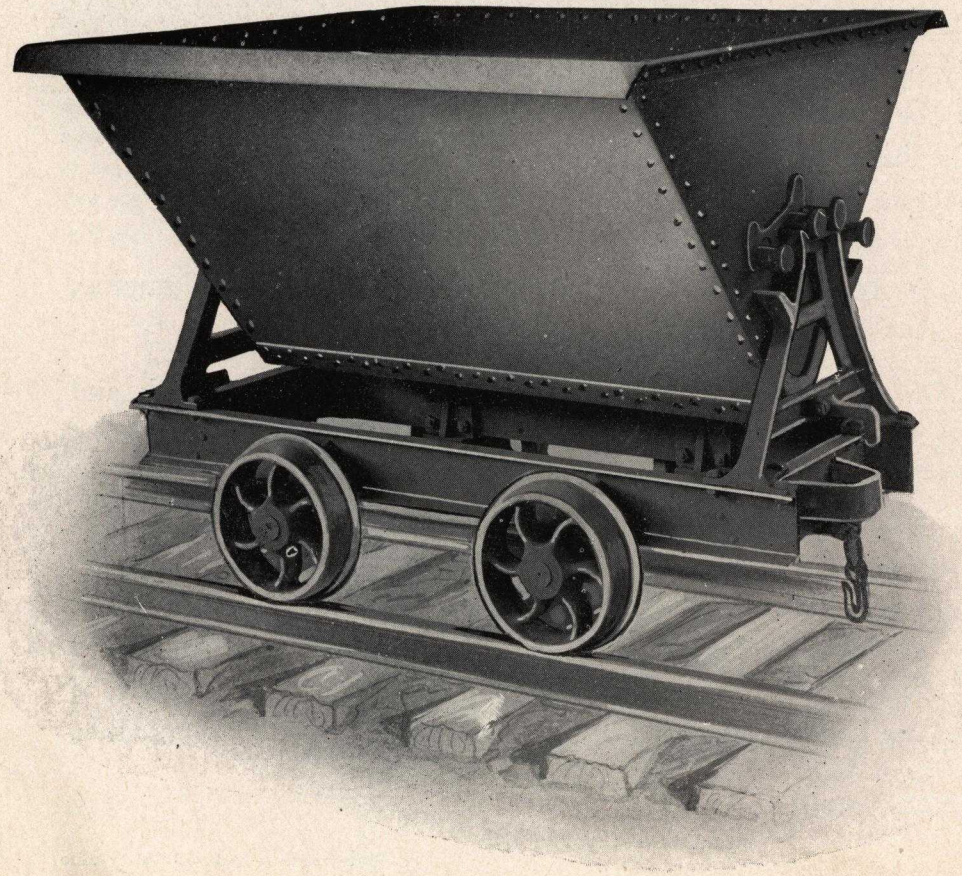


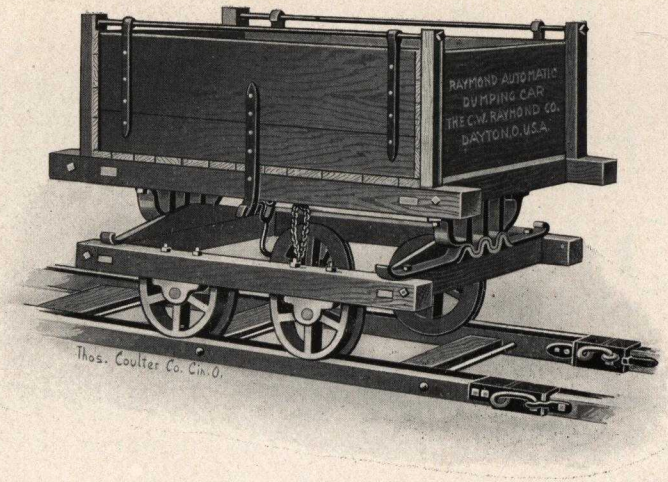
Dumping Position.

The car is built of the best grade of white oak and well painted; it has heavy axles and chilled face wheels. The axles are supported by heavy iron gudgeons and reinforced by long braces attached to the bed of the car. It is otherwise substantial throughout. They are made in two sizes having a capacity of one, and one and one-fourth cubic yards. Gauge, 36 inches; length over all, 7 feet 8 inches; width over all, 4 feet 1 inch; height from the top of the track to the top of the bed, 3 feet 2 inches. Approximate weight, 1200 pounds.

The Raymond Steel Side Dumping Cars.

THIS car is built for the roughest of usage and is made entirely of steel. Body of car is hung on Malleable Iron Trunions resting on malleable supports. Chilled wheels, self-oiling boxes with bronze bearings. Commonly used in handling clay or shale. We can guarantee this car as the most substantial car built.





1 Yard Capacity, Weight 1000 Pounds.
1¼ Yard Capacity, Weight 1125 Pounds.
1½ Yard Capacity, Weight 1265 Pounds.
2 Yard Capacity, Weight 1765 Pounds.
2½ Yard Capacity, Weight 1865 Pounds.
3 Yard Capacity, Weight 2250 Pounds.

Rocker Dumping Cars.

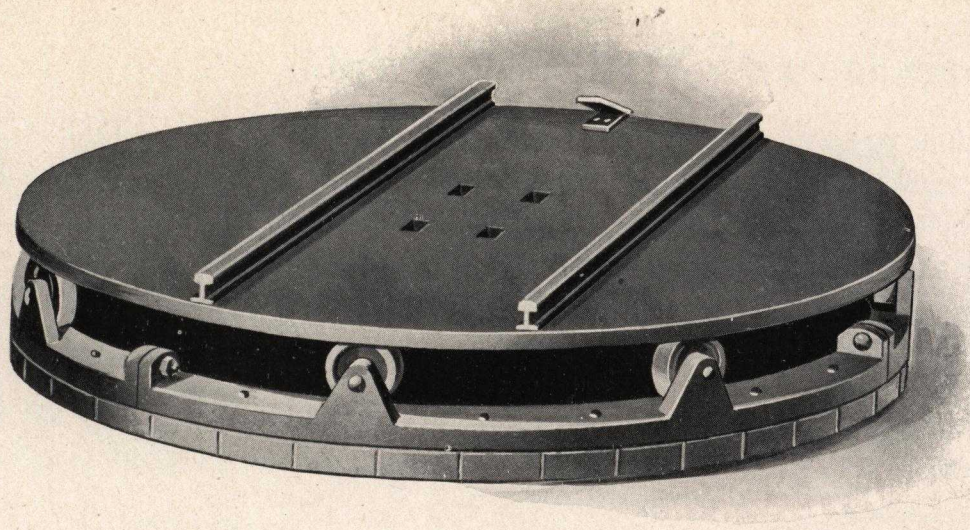
TO MEET the requirements of the smaller yards we offer the Rocker Dumping Car, quite a convenient, handy car and answers well for the ordinary work of brick yard transportation. It is constructed of oak and well painted. It can be dumped on either side or drawn from either end. It has been found a popular tool for the brick plant. This car is not automatic, but is easily manipulated by hand. Capacities ¾ to 1 cubic yard.

Bed is 6 feet 8 inches by 3 feet 10 inches. Height from top of track to top of bed, 4 feet. Axles are steel, 1½ inches in diameter. Wheels, 14 inches high by 3 inches face, of charcoal chilled iron. Weight, 900 pounds.

The Raymond Turn Tables.

ONE of the greatest nuisances around a brick plant is a poorly constructed Turn Table and there is probably nothing in the yard equipment which wastes more time than one badly operating and which causes more damage, particularly so when used in connection with the green product.

To obviate these difficulties, we have designed an all iron and steel Turn Table which is built in two styles, one with tracks running one way and another with tracks running two ways and at right angles. In construction they are both the same. In our illustrations, however, the two way turn table shows the correct superstructure.



One Way.

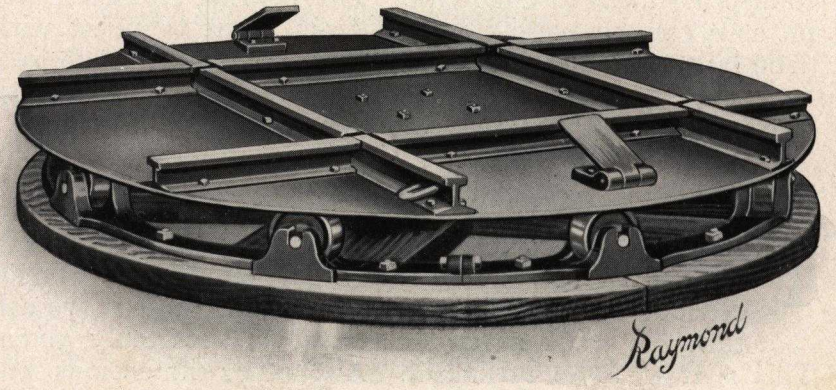
The Raymond Turn Tables are built up on a heavy framework of oak securely and thoroughly braced in all directions. The top of this is a cast ring fitted with rolls which support the disc or revolving portion at the outer circumference of the table. In the center is a pivot bearing which is known to be one of the easiest turning bearings, particularly for rough work and also its form tends to keep the table revolving absolutely true, hence, increasing the ease by which it is turned.

The disc or the revolving section is made of heavy boiler plate and riveted to it in the exact center is the upper portion of the pivot bearing and to the outer edge underneath, is found a track which takes up the wear from the rollers and is replacable.

Stops are provided whereby the table can be locked for the removal of the car. The track itself consists of "T" rail securely fastened to the disc and both ends of the track are provided with stops to prevent the car from running off while the table is in motion.

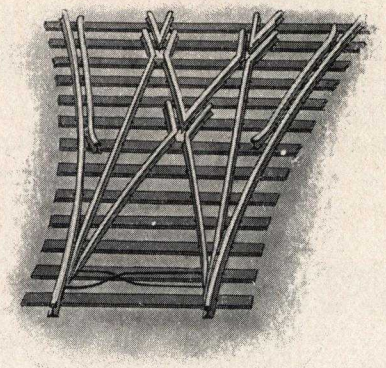
These tables are made of a standard gauge of 24 inches and in diameters of 56 inches, 60 inches, 66 inches, 72 inches and 84 inches.

We also manufacture a turn table supported on a transfer car for use where this form of construction is required.

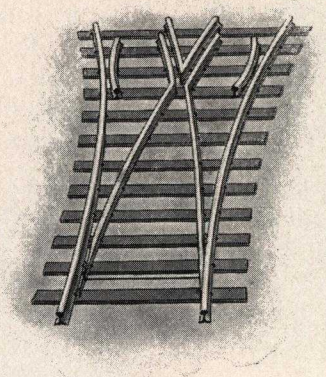


Two Way.

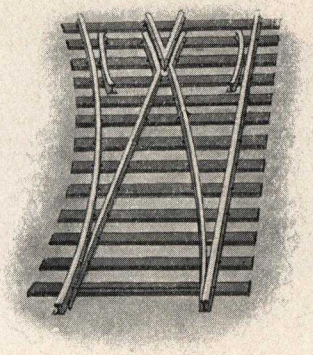
The Raymond Trackage and Yard Equipment.



Three Way.



Two Way.



Right or Left.

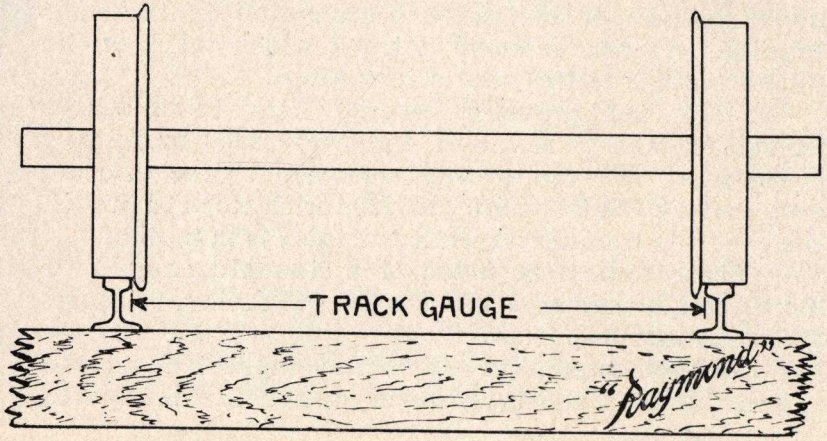
IN ORDER to accommodate the needs of the brickmaker for quick delivery and complete his equipment, we usually carry in stock considerable quantities of 12 pound and 16 pound "T" rail, fish plates, spikes and track bolts. This track equipment also includes the making of steel switches either two way, right or left or three way. In ordering, it is also necessary for us to know the size rail, gauge and radius of the curve. While a rarity in brick yard construction, we can furnish cross overs of any angle.

We also manufacture a very serviceable Portable Track in sections 12 feet, 14 feet, 16 feet and 18 feet long, with switches and curves and any gauge. This track is built of 2 x 4 wood stringers, thoroughly braced and tied, with connecting locks at each end. The wearing surface is well ironed. This is a very great convenience for use in the pit as it can be readily moved from point to point with little labor, requiring no laying of ties or spiking thereto.

We can also furnish at short notice, any quantity of crucible steel wire rope of various standard diameters.

Track Gauge.

IN ORDERING cars it is always necessary to specify with exactness the desired gauge. That we may obviate the possibility of error in this matter, we ask that the track gauge as shown, be invariably given. This is from in to in of rail. Any other dimensions will but tend to confusion.

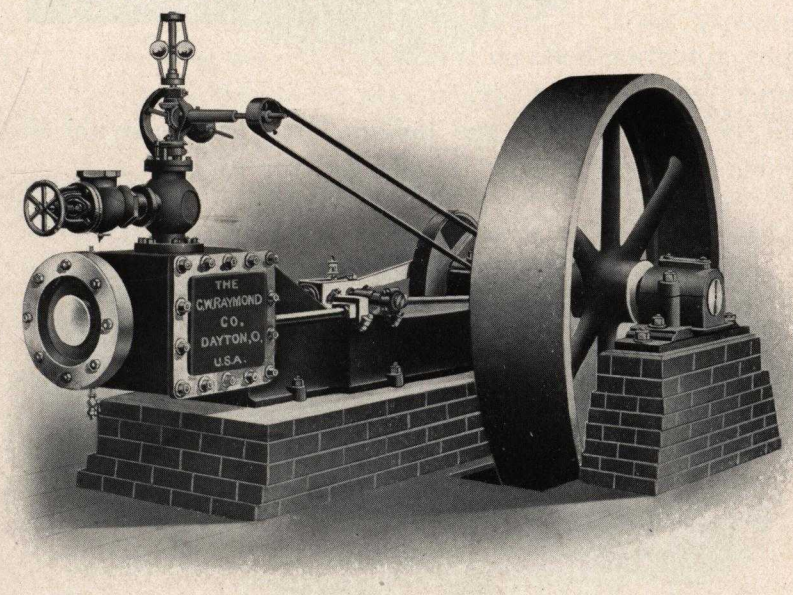


The Raymond Power Plant Equipment.

IN THE equipping of Power plants for brick works the many and varied ideas on the subject, as well as the numerous conditions governing the kind of plant required, brings us to the furnishing of any of the standard equipment manufactured by reputable companies rather than limiting ourselves to one line of manufacture.

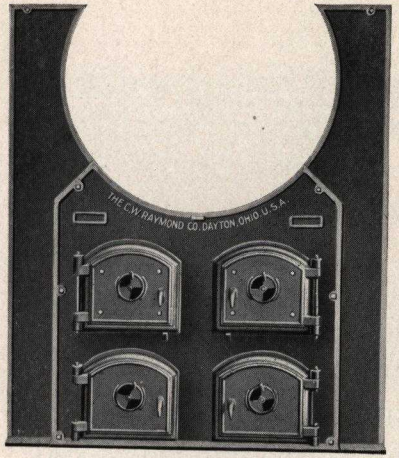
Therefore, it is necessary that we receive the specifications at the time of placing contract, otherwise we will use our own judgment in supplying this class of equipment.

In a moderate sized brick plant the power equipment is usually limited to a slide valve, throttling engine of the type illustrated, and of the required horse power, an one hundred pound working pressure horizontal tubular boiler of 25% or more greater horse power than the engine, a feed water heater and feed pump. From this simple plant a larger equipment can be specified thereby obtaining greater economy by the use of a four valve engine or simple or compound corliss and 125 or 150 pound working pressure boilers. This will give the maximum fuel economy which is an item of vastly greater consideration than the initial cost.



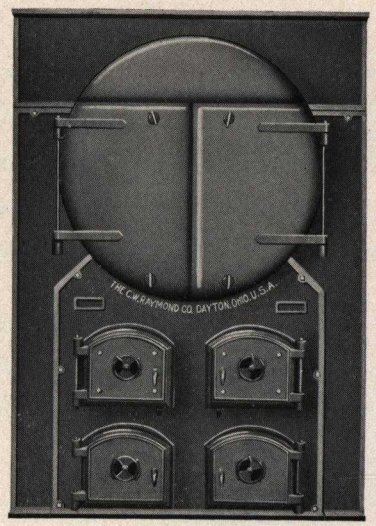
Throttling Slide Valve Engine.

From the fact that there are no two clays or shales with identical physical properties the horse power required to operate a brick machine or an entire plant, is very largely approximate until the material has been used under practical conditions. For this reason we cannot absolutely guarantee the amount of required horse power only use our very best judgment and allow a sufficient margin of safety to meet any reasonable demands. Inasmuch as we



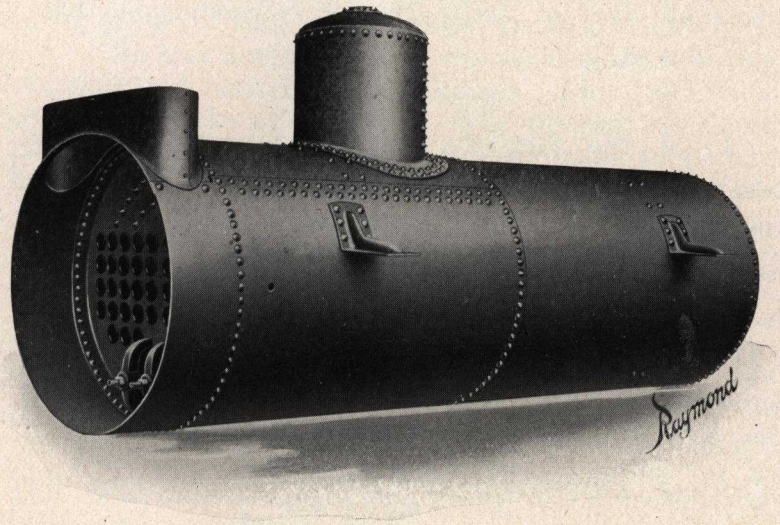
Half Front.

do not manufacture the power equipment, we do not undertake to guarantee its efficiency or workmanship however, this is done by the makers. Our only consideration in this respect is that we will furnish equipment of the standard design of a reputable manufacturer. Nor do we furnish the piping between the boilers and engine or the connections to feed water heaters and pump as these cannot be definitely known until complete working drawings have been made. The boilers will be normally furnished with a half arch front, however, a full arch front will be furnished on specifications.

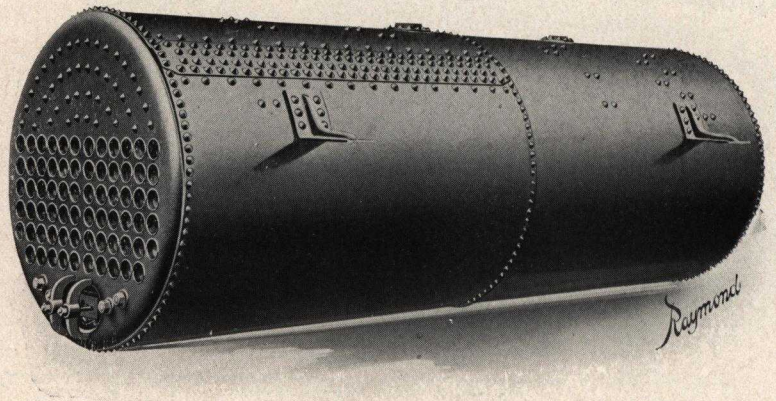


Full Front.

With the above noted exceptions and the furnishing of a whistle our power plant equipment contemplates only such as is necessary to absolutely place a plant in active operation including foundation bolts, throttle valve, governor, governor belts on the engine and two injectors, grate bars and bearing bars for the boilers. Anything else not in our regular equipment will be charged for extra.

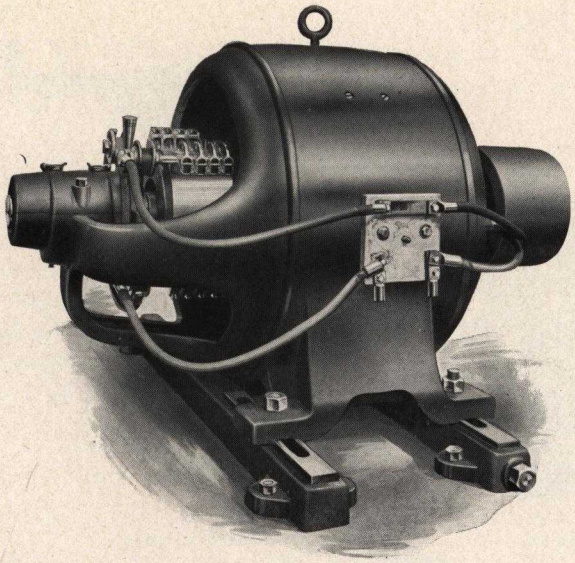


Boiler with Dome.



Boiler Without Dome.

Electrical Equipment.

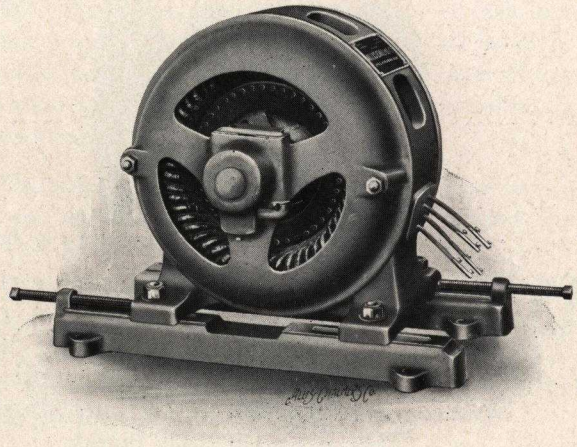


Direct Current Motor.

The electrification of brick plants is now becoming a very important factor and where electrical power is available at a reasonable rate this method of driving has proven eminently successful where properly installed. A great number of failuers have occured, however, due to the inherent construction of the machinery. Brick machinery in all of its forms, is built with great weight and for very rough, heavy work and to withstand enormous vibration. This precludes the possibility of successful gear connecting brick machinery to the motors as this vibration will shortly separate the two machines forcing the gears out of mesh and causing disaster. Considerable experimentation has been done along these lines and a number of plants installed, but all with the same result.

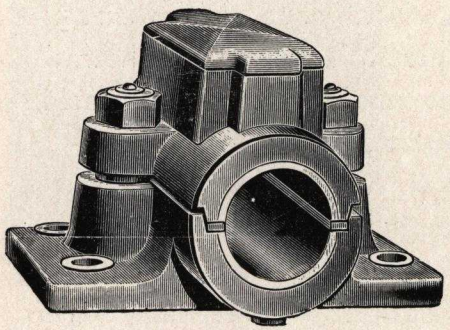
Taking into consideration these various facts the only successful and approved method of electrical drive for brick making machinery is to belt connect the various machines to their respective motors. This gains the great resiliency of the belt allowing leaway in the sudden changes of power in the handling of clay. Again, this allows the starting of the motor without load except the friction clutch pulley which can be put into service after the motor has attained its full speed preventing the necessity of overfusing with the attendant possibility of damages and expensive burnouts.

We can furnish either alternating or direct current motors for any voltage and rating.

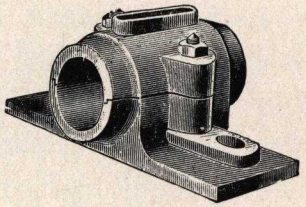


Alternating Current Motor.

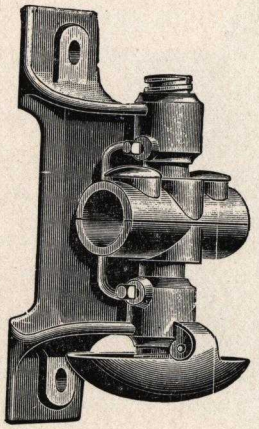
The Raymond Power Transmission.



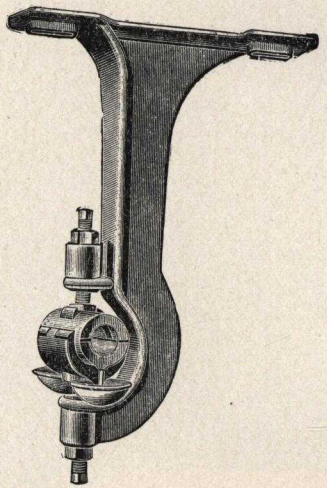
Pillow Block



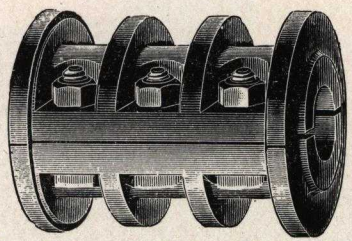
Common Flat Box.

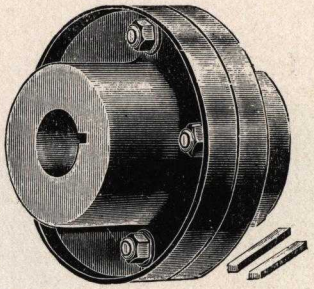


Post Hanger.

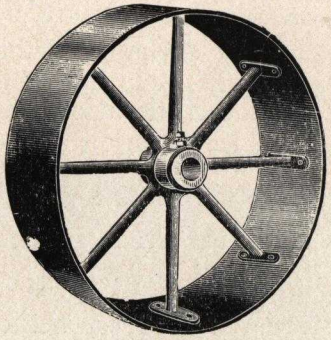


Single Brace Drop Hanger





Compression and Flange Couplings.



Patent Wrought Rim Pulley.

WE ARE prepared to furnish on short notice complete transmission equipment for belt drive consisting of single and double brace drop hangers, rigid and adjustable pillow blocks, post hangers, plain and safety set collars, compression couplings, cotton stitched, rubber or leather belting, cold rolled steel shafting, solid or split wrought rim pulleys and wood split pulleys.

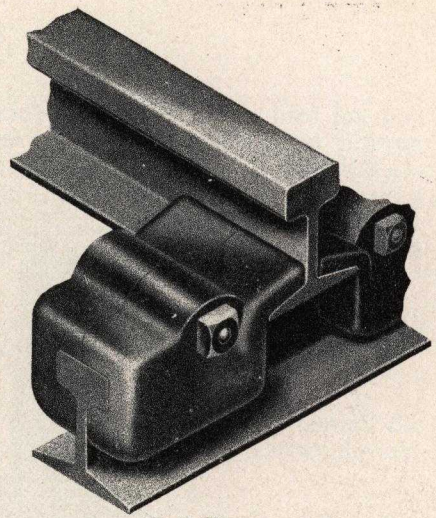
We can also furnish any of our standard size friction clutch pulleys as furnished with our machines. These are all brass bushed and crown faced.

The Drying of Clay Products.

UP TO the nineteenth century, but little was known of the laws governing the drying of clay wares. Previous to that time brick were dried in the open air by means of the heat from the sun's rays and the action of the wind.

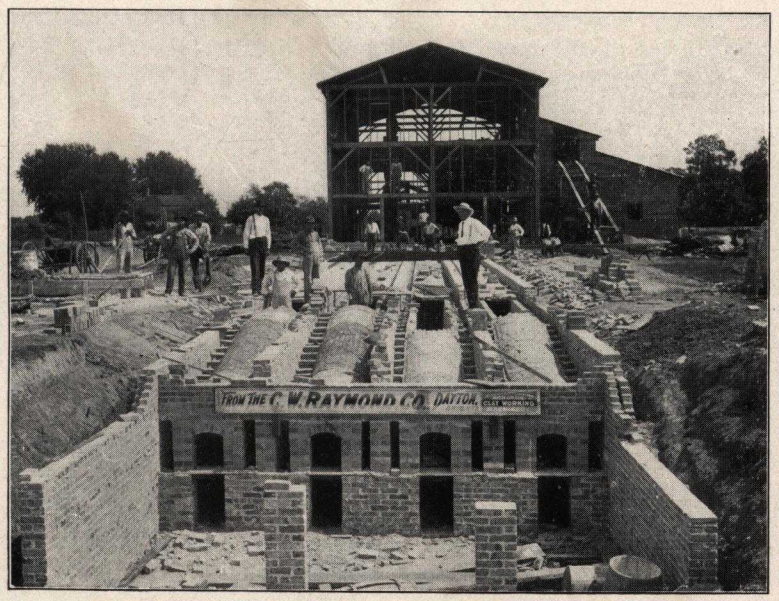
With the development of the clay industry to large capacities, came the first efforts to dry clay wares by means of artificial heat.

The first attempts were only partial failures, and were such an improvement and made drying so much more certain, that it was realized that with further development, success would ultimately be attained. Most of the failures were caused through the idea that heat alone was necessary in drying, and no adequate provision was made for a flow of air past the ware. Other causes of failure were, the inability to start the drying at a low temperature and gradually raise it as the drying progressed, and the lack of control of the temperature in the drying chambers.



Rail Clamp.

For years various improvements have been going on and one system after another has fallen into disuse, until today we find two, the Radiated Heat Tunnel Drying System and the Waste Heat Tunnel Drying System, remaining as the only successful methods for drying heavy wares.

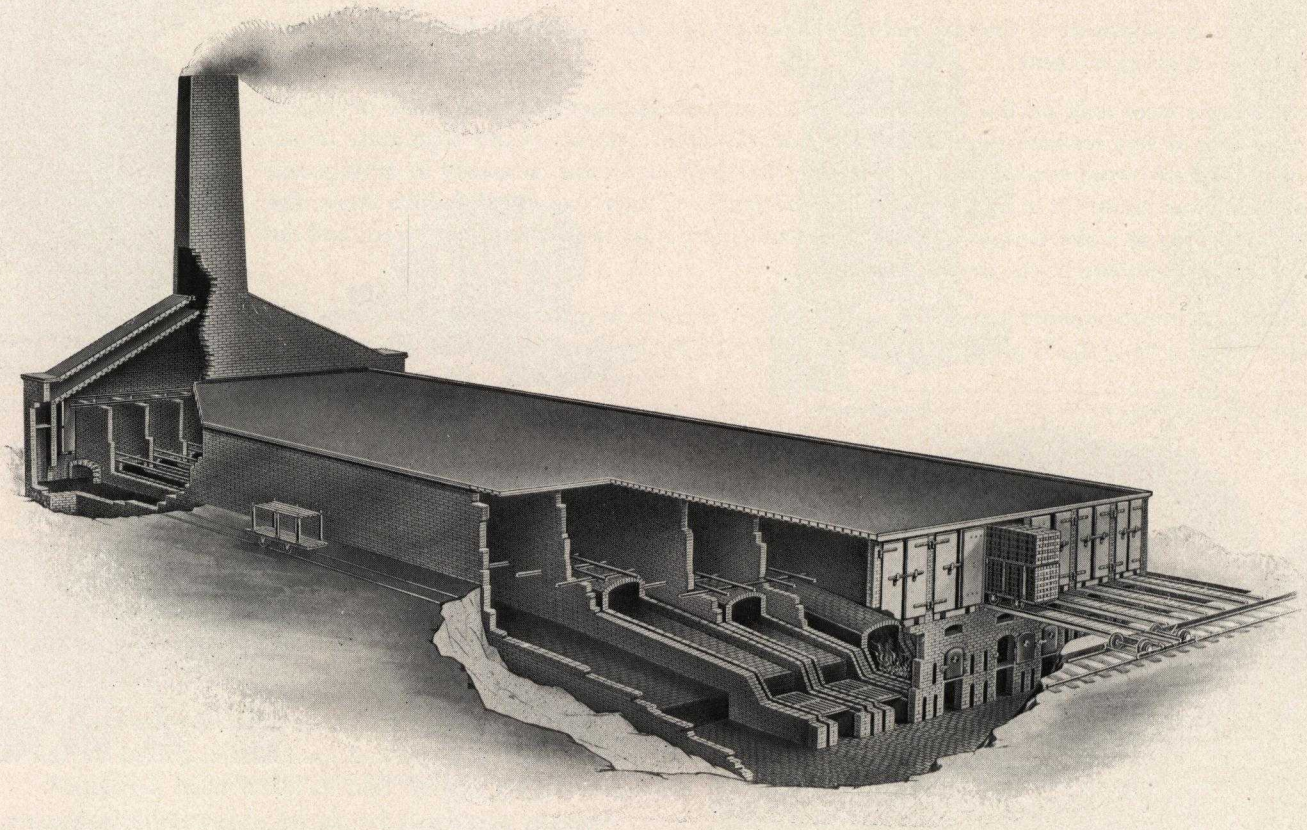


Radiated Heat Dryer Under Construction.

It is a generally admitted fact that a drying system, in order to give highest efficiency in every way, must be a tunnel system. There are two Radiating Heat Tunnel Drying Systems—one using coal, gas or oil, the other using steam coils. The latter, while once popular, is very little used today. Among other unsatisfactory features it was found to be absolutely impossible to prevent leaks at the hundreds of joints, tees, elbows, etc., required by the system and the cost of upkeep was, therefore, so heavy that its use has practically been discontinued.

The direct fired Radiated Heat Dryers have overcome all of the faults of other systems and are now recognized as the most perfect and cheapest drying system that has ever been developed.

Waste heat dryers have proved very successful under some conditions. Where the heat from a large number of kilns is available and clays used that will stand harsh drying treatment, they have been very successful. The system, however, is more expensive to construct and costs more to operate than the Radiated Heat Dryer.



The Raymond Radiated Heat Dryer.

Covered by United States Letters Patent.

The Raymond Radiated Heat Dryer.

THE Raymond Radiated Heat Dryer is constructed entirely of brick, cement and iron and is absolutely fireproof. The heat for drying is secured by direct firing into the furnaces, either with wood, coal, gas or oil, the gaseous products of combustion passing through the flues the entire length of the dryer, and discharging into the atmosphere through the stack. At no time does the gas or smoke come into contact with the drying ware or cars. The air for drying is taken in around the hottest parts of the furnace and is immediately raised to its highest temperature. As the hot air passes on through the cars of brick, it is gradually cooled, absorbing the moisture as it goes, until it reaches the extreme or cool end of the tunnel, where it is drawn into the same stack which carries off the refuse products of combustion and discharged into the atmosphere.

The car, loaded with the green ware, is first introduced into warm, moist atmosphere at the cool end which produces a sweat, due to the condensation of the water vapor, on the surface of the cool ware. This keeps the surface damp and prevents excessive and uneven shrinkage, due to the exterior of the ware remaining damp until the moisture is drawn from the interior.

As the car progresses down the tunnel, the air becomes drier and warmer, so that when the hot or discharged end is reached all the moisture has been withdrawn from the interior of the ware without checking or cracking and the brick are delivered bone dry, evenly shrunk, without check or flaw, ready for the kiln.

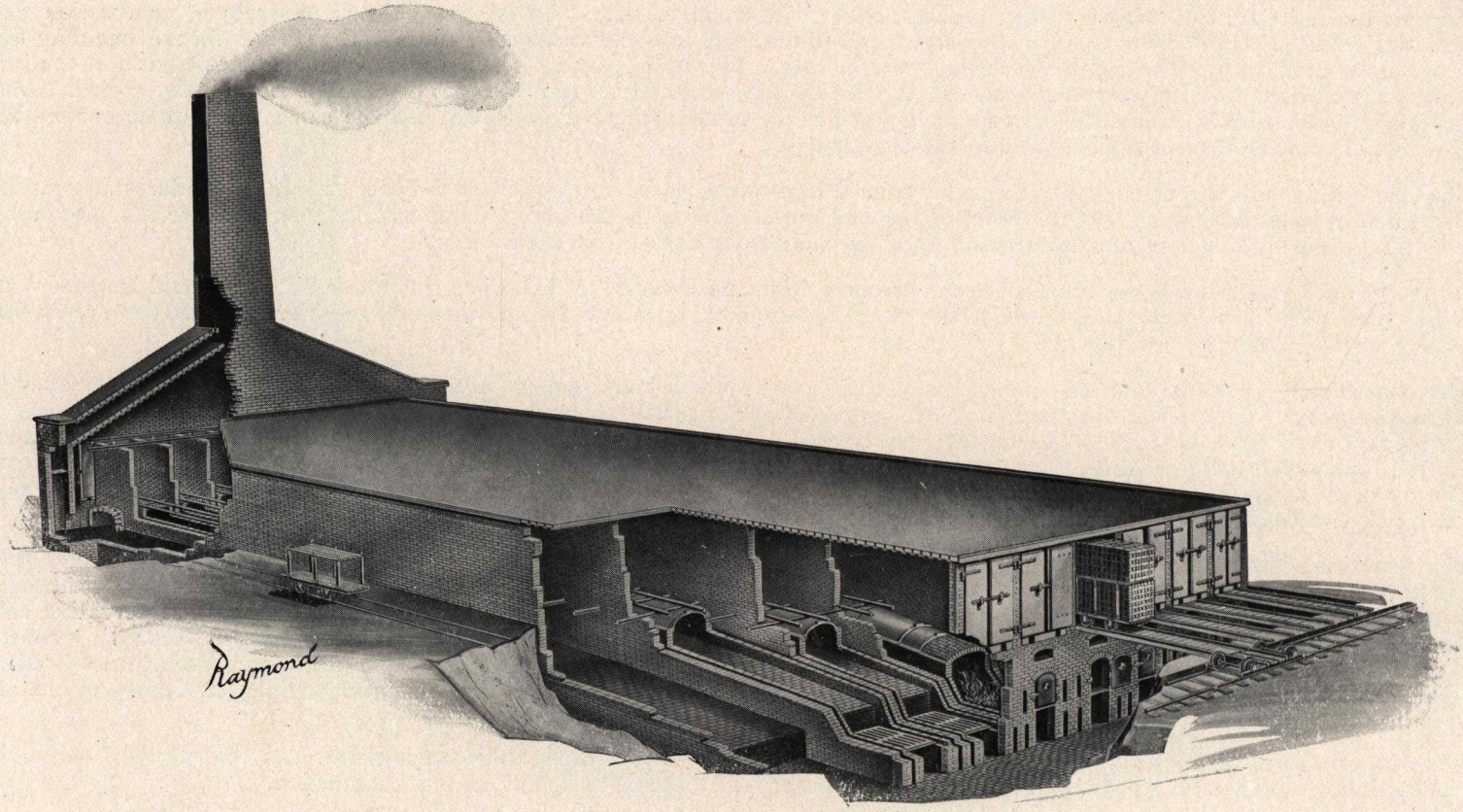
The construction is simple and the cost of installation low. Only a small amount of excavating is necessary, and all cumbersome iron work is eliminated. The roof is constructed of "T" iron roof bars supporting brick or hollow tile which is covered with any good weather proofing and air tight material. The ties are constructed of "T" rails extending from one side of the drier to the other and imbedded in the tunnel walls, thus holding them firmly and preventing movement in any direction. The rail clamp, as will be seen in the illustration, securely locks the rail and tie, clamping them with one bolt so that spreading, with its consequent wrecking of cars, is impossible. The brick construction of the walls and roof may be substituted by hollow tile or monolith.

The most important feature of the Raymond Radiated Heat Dryer is its economy of operation. In this dryer the flues through which the heat is conducted are so constructed that three sides are utilized for radiating heat. This increases the radiating surface 200 per cent. above that of other types of hot air dryers on the market. To the clay worker, this means, at the most conservative calculation, a 50% saving in fuel. This reduction of the fuel bill is worthy of very serious consideration. The economy is secured by constructing the heat flues independent of the tunnel walls and utilizing the space between them for air ducts. Furthermore, each tunnel is absolutely independent of the others, allowing any one tunnel to be operated during the idleness of the remainder or different degrees of heat to be maintained in different tunnels.

The ware is always clean and free from scum that would be caused by the products of combustion. As the cars are only exposed to pure hot air no trouble is ever experienced in having them damaged by the acids in the gases of combustion.

Our standard installation contemplates tunnels 100 feet long with fifteen foot receiving and discharging ends, iron doors and necessary trackage and ties for the interior of the dryer, furnace doors, grate bars, roof bars and necessary supports for carrying walls over tunnels.

The capacity of the dryer is entirely dependent on the speed with which the material can be safely made to surrender its moisture and varies from 24 to 60 hours for brick. The average stiff or soft mud brick will dry in 24 hours. Fireproofing and holloware will dry in from 12 to 24 hours. On this basis all our standard installations are figured. Some clays will stand much more rapid drying than others. The dryer can always be operated to either the full limit of its heat and circulation or adjusted to handle the tenderest material.



The Raymond Metallic Radiation Dryer.

Covered by United States Letters Patent.

The Raymond Metallic Radiation Dryer.

THE Raymond Metallic Radiation Dryer is another type of the Radiating Heat System but designed for clay wares that will stand high drying temperatures and quicker drying. It is built entirely of brick, cement and iron. The heat for drying is secured by direct firing into furnaces, either with wood, coal, gas or oil, the gaseous products of combustion passing through flues the entire length of the dryer, at no time in contact with the ware, and are discharged into the atmosphere through the stack. The air for drying the ware is taken in around the hottest parts of the furnace and is immediately raised to a high temperature. As the air passes on through the cars of ware, it is gradually cooled, absorbing the moisture as it goes, until it reaches the extreme or cool end of the tunnel, where it is discharged into the atmosphere through the same stack with the refuse products of combustion.

The car loaded with ware, is first introduced into the warm, moist atmosphere, producing a sweat caused by the condensation of water vapor on the cool surface of the product. This keeps the surface damp and prevents uneven shrinkage until the moisture is drawn from the interior.

As the car progresses down the tunnel, the air becomes dryer and warmer, so that when the hot or discharge end is reached all the moisture has been withdrawn from the interior of the ware without checking or cracking the outside, and they are delivered thoroughly dry, evenly shrunken, without check or flaw, ready for the kiln.

The construction is simple and the cost of installation low. Only a small amount of excavating is necessary, and all cumbersome ironwork is eliminated. The roof is constructed of "T" iron roof bars supporting brick or hollow tile, which is covered with any good weather proofing and air tight material. The ties are constructed of "T" rails extending from one side of the dryer to the other and imbedded in the tunnel walls, thus holding them firmly and preventing movement in any direction. The rail clamp, as will be seen in the illustration, securely locks the rail and tie, clamping them with one bolt so that spreading, with its consequent wrecking of cars, is impossible. The brick construction of the walls and roof may be substituted by hollow tile or concrete.

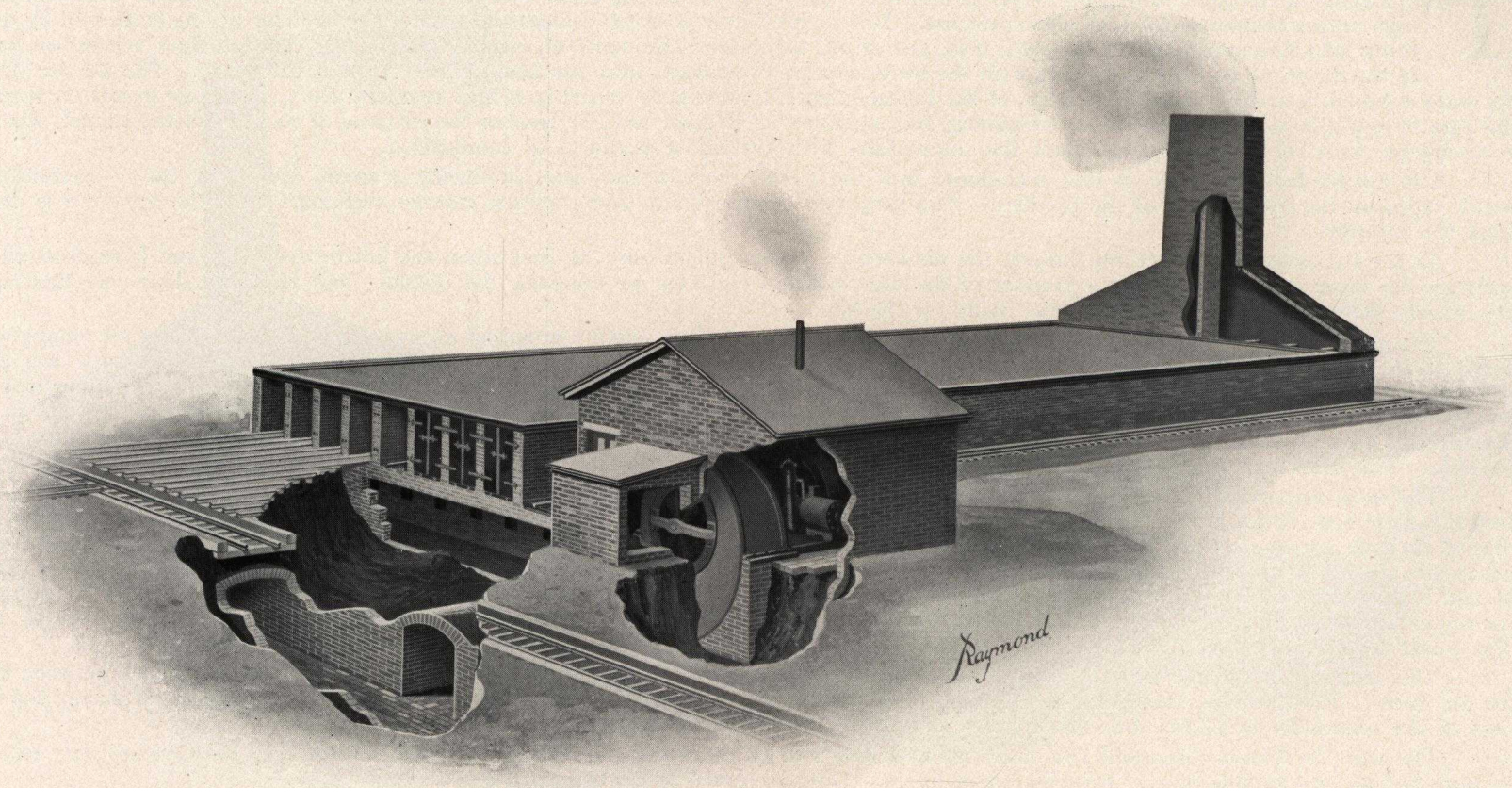
The most important feature of the Metallic Radiation Dryer, is the economy of its operation. It is a well-known fact that some materials radiate heat better than others, and it is particularly true that iron and steel are among the best radiating materials. This is evidenced in their use in stoves and furnaces. With this fact in view, we have designed the Metallic Radiation Heat Dryer especially for use where the clays will stand rapid drying without injury. In this dryer, the side walls of the flue are constructed of brick but the tops consist of cast iron sections 30 inches long. The metallic topped flue effects a wonderful saving of fuel, amounting in some cases to 75 per cent. An important feature of this construction is the ability to remove any of the metallic covers for the purpose of cleaning the flues of soot. The joints between sections and between the sections and walls are so designed as to make them absolutely gas tight.

The economy is further secured by constructing the heat flues independent of the tunnel walls and utilizing the space between them for air ducts. Furthermore, each tunnel is entirely independent of the others. This allows any one tunnel to be operated during the idleness of the remainder or allows different degrees of heat to be maintained in different tunnels.

The ware is always clean and free from scum that would be caused by the products of combustion. As the cars are only exposed to pure hot air, no trouble is ever experienced in having them destroyed by acids formed by the waste gases.

Our standard installation contemplates tunnels 100 feet long with a fifteen foot receiving and discharge end, iron doors and necessary trackage and ties for the interior of the dryer, furnace doors, grate bars, roof bars, and necessary supports for carrying walls over the tunnels, and metallic radiators.

The capacity of the dryer is entirely dependent on the speed with which the material will surrender its moisture without injury and varies from 24 to 60 hours. Fireproofing and holloware dry in from 12 to 24 hours. On the above basis all of our installations are figured. Some clays will stand much more rapid drying than others. The dryer can always be either operated to the full limit of its heat and circulation or can be adjusted to handle the tenderest material.



The Raymond Waste Heat Dryer.

The Raymond Waste Heat Dryer.

IN THE past few years the system of drying clay wares by means of the waste heat from cooling kilns has come into rather wide use on plants having a sufficient number of kilns, sometimes with poor and even disastrous results. The system is not suited to every kind of clay for several reasons. The principal disadvantage is that many clays will not stand the direct contact of the hot gasses, without injury. Other troubles are: The scumming of ware through the inability to completely damper off the kiln under fire, the destruction of the hot air blower by the hot gases and the cost of operation and upkeep of fans and engines. However, in spite of these disadvantages, there are certain conditions under which the system works economically and well.

In most Waste Heat Systems, great trouble is caused by the lack of proper circulation of the air through the tunnels. This is due to their poor design. It will be readily seen even by the uninitiated, that there is an enormous friction on the air currents in passing through the cars of ware, in tunnels where the tracks are laid directly on the floor, and the ware and cars practically fill the entire cross section of the tunnel. This is the construction generally found, and even the exhaust fan, which is always found in dryers of such construction, is often unable to keep the air circulating as fast as is necessary.

In the Raymond Waste Heat Dryer this difficulty has been entirely overcome, and in such a manner that even the exhaust fan has been eliminated, thus doing away with half the power required in other systems, with the attendant cost of installation, operation and upkeep. At the same time in our system the results are even better.

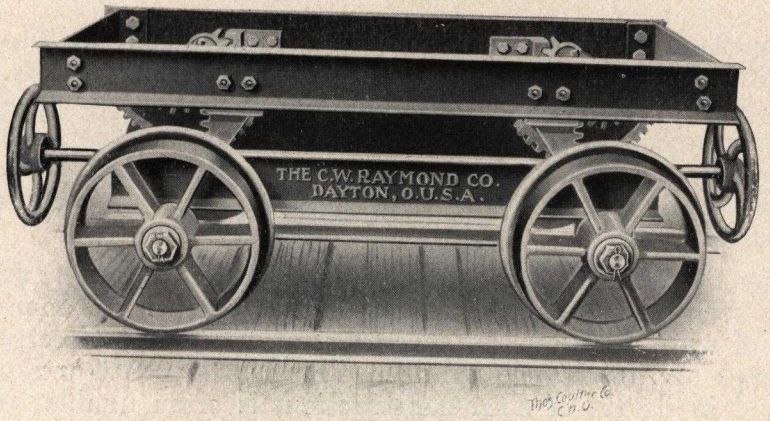
As far as the blower, the construction of the Raymond Waste Heat System is the same as others. The tunnels, however, are constructed differently. Beneath the tracks, for the full length of each tunnel, we have an air space by suspending the tracks above the floor on cross rails which run entirely across the dryer. Into this air space, for a short distance at the hot end, the waste heat is blown through ports in the floor. The air space relieves the friction on the air current and allows it to flow readily towards the cool end. However, a small part of the waste heat is conducted through a flue under the floor instead of being taken into the tunnel. This hot air is conducted directly to the stack, heating it to such an extent that a draft is set up which is powerful enough to draw the saturated air from the tunnels into the atmosphere through the hot stack. We thus eliminate the exhaust fan. Dampers in the hot air ports and stack allow perfect control of the temperature in each tunnel and the air space beneath the tracks make them easy of access.

A fan or blower of the most perfect design is furnished with the dryer. This can be operated by steam or electric power.

The length of time required to dry is entirely dependent on the character of the clay used.

For such an installation we make a special design with separate and suitable equipment, as no two plants, or no two kinds of material require the same treatment, but each must be considered individually. Our dryer engineers are experts and capable of handling the most difficult drying problems.

The Raymond System of Open-Air Drying



Raising and Lowering Car.

IS AN economical method of handling green brick from the off-carrying table to the kilns. One man or boy, with a reasonable distance to travel, can handle approximately 4000 brick per hour from the off-carrying table to the drying sheds, and another man or boy can handle an equal amount from the drying sheds to the kilns.

The car is so designed and constructed that it is capable of handling from 400 to 500 brick with the greatest ease and rapidity, at the same time eliminating all undue jar and consequent marring of faces and edges.

In close proximity to the carrying-off table is placed a pallet turn-table, capable of sustaining two pallets with their load. The near pallet is hacked, and the pallet turntable turned bringing the empty pallet convenient for the off-bearer. This method saves the time required to walk to the end of the two pallets, some six feet distant, thus allowing the off-bearers to complete their work with rapidity and ease. The elevating car with lowered bed is run under the two loaded pallets and the bed raised. In this manner the car is run onto the transfer car along the front of the sheds. This transfer car is preferably fitted with clamps, holding the elevating car perfectly rigid, obviating any possible jar caused by moving between the stops. From the transfer car the elevating car is run onto the proper track and the bed lowered, allowing the pallets to remain on the permanent pallet rests, which are constructed in the sheds.

After the brick are dried, another elevating car takes the loaded pallets and deposits them on a portable pallet rest placed in the kiln. This portable pallet rest is almost identical with the one on the turntable, excepting it is mounted on skids and can be removed from place to place and from kiln to kiln.

The saving effected by this system is from six to twenty boys with trucks and common pallets, besides insuring a careful handling of the product, thus increasing its value. The construction of the car provides that it cannot be lowered with a sudden jar or jerk and the transfer car clamp holds the elevating car perfectly rigid at all times. The smoothness of the track and connections must then be provided by the brick maker.

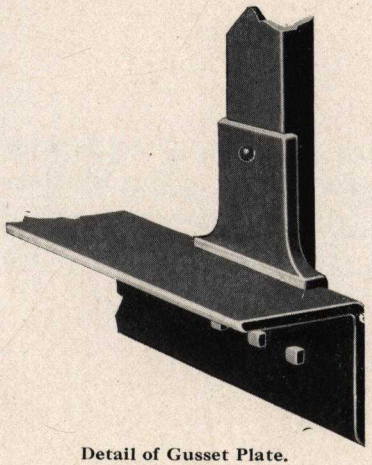
Dryer Cars.

AFTER several years of handling dryer cars and meeting with only indifferent success as to the quality obtained, we have designed and constructed the Raymond Car. Our attitude heretofore has been that of a middleman from which position we could readily study the different forms of construction and the needs of the consumer as well as the errors of the manufacturers. Consequently, in designing the Raymond Cars, we have been able to overcome the weaknesses heretofore existing and at the same time keep alive to the valuable features.

The Raymond Dryer Cars

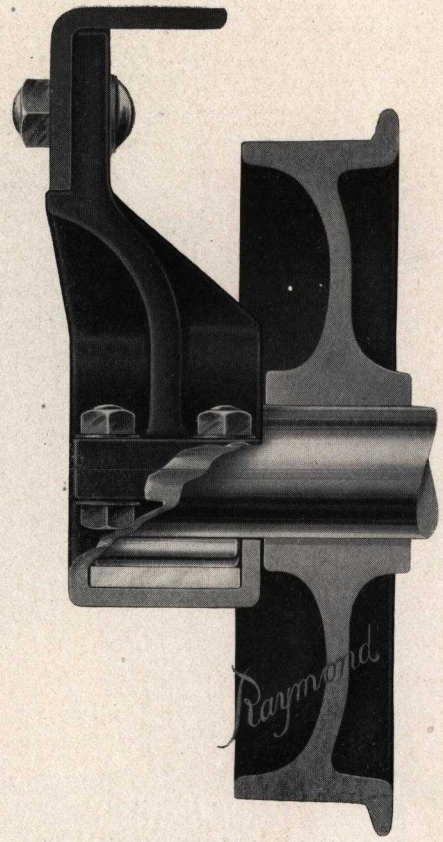
are made with their full allowance of material, without stint, bringing the exact weight to that of the average estimated weight. The axles are lathe turned with the wheels forced on under heavy hydraulic pressure. The boxes are ground true and with turned axles running on steel rollers, form the bearings. Notwithstanding the heavier weight, the careful construction and accuracy of this bearing, assures a car which will run with the least possible friction.

In the construction of the body, four cross pieces are used which fasten to the side rails by means of angle plates, two of which are used to each end cross piece and four to each middle cross piece. A fair idea of the manner of this construction can be obtained from the illustration of car "A."



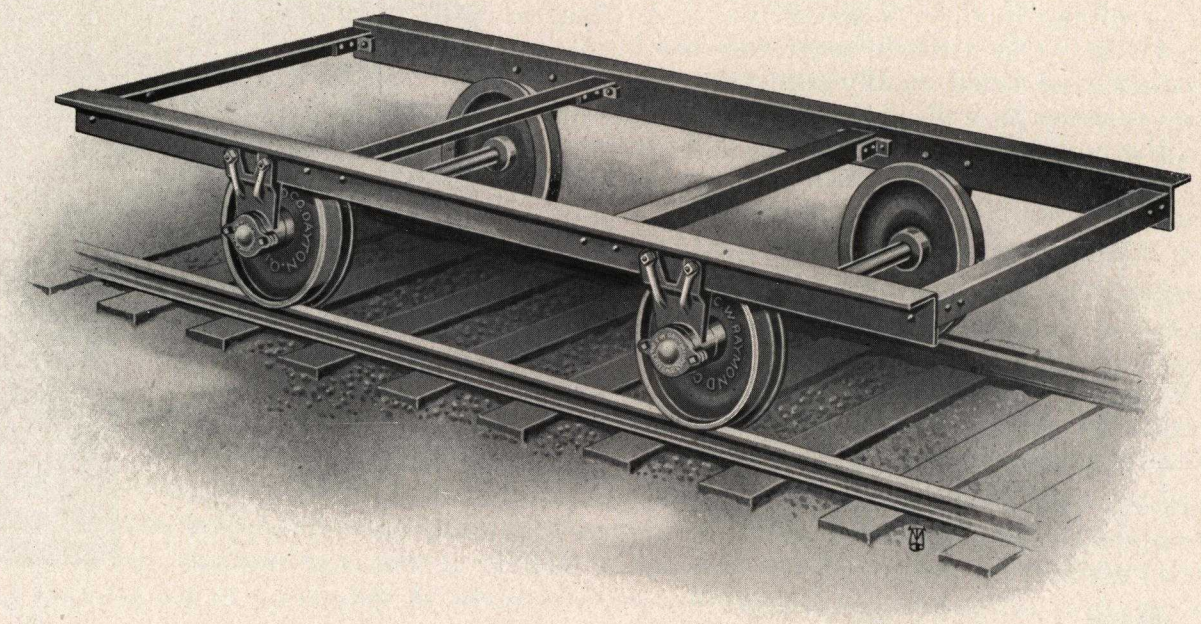
Detail of Gusset Plate.

The uprights are made from one piece of angle iron, bent to conform to the proper shape. The gusset plates are malleable and fastened to the side rails with three bolts, one of which passes through the upright. This upright is further held by a rivet through the gusset plate.



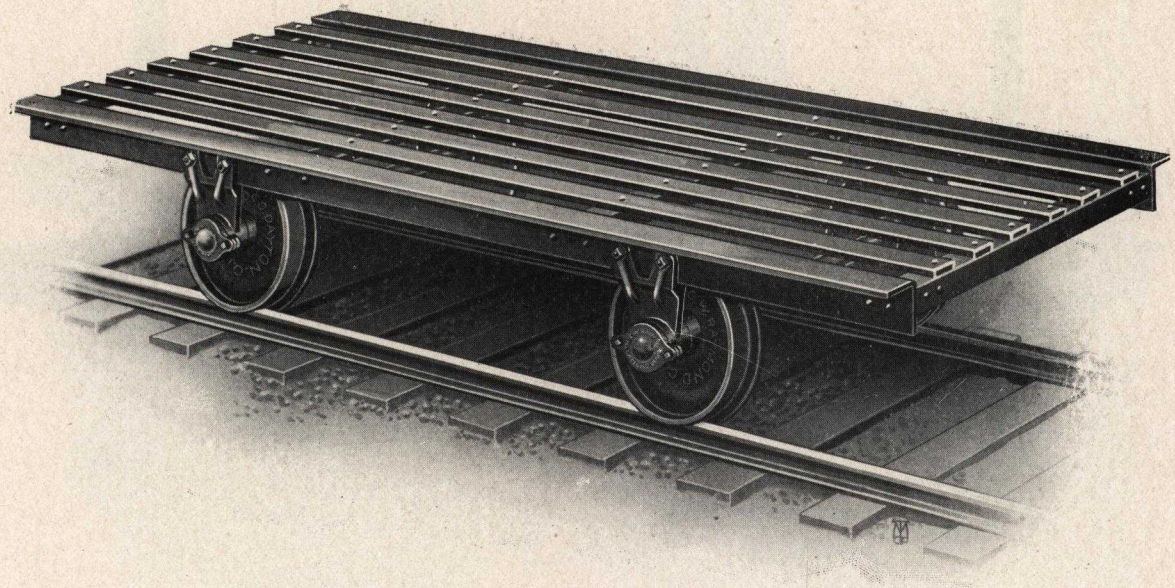
Section Through Bearing.

In further reference to the boxes, we have designed the one shown as being the most satisfactory bearing used on any dryer car made. It is in two pieces, saving time in assembling and easily accessible in case of necessity. It is also fitted with a bushing on which all wearing occurs and it is readily replacable when worn. The insertion of a new bushing will place the car on the same easy running qualities that it had in the beginning.



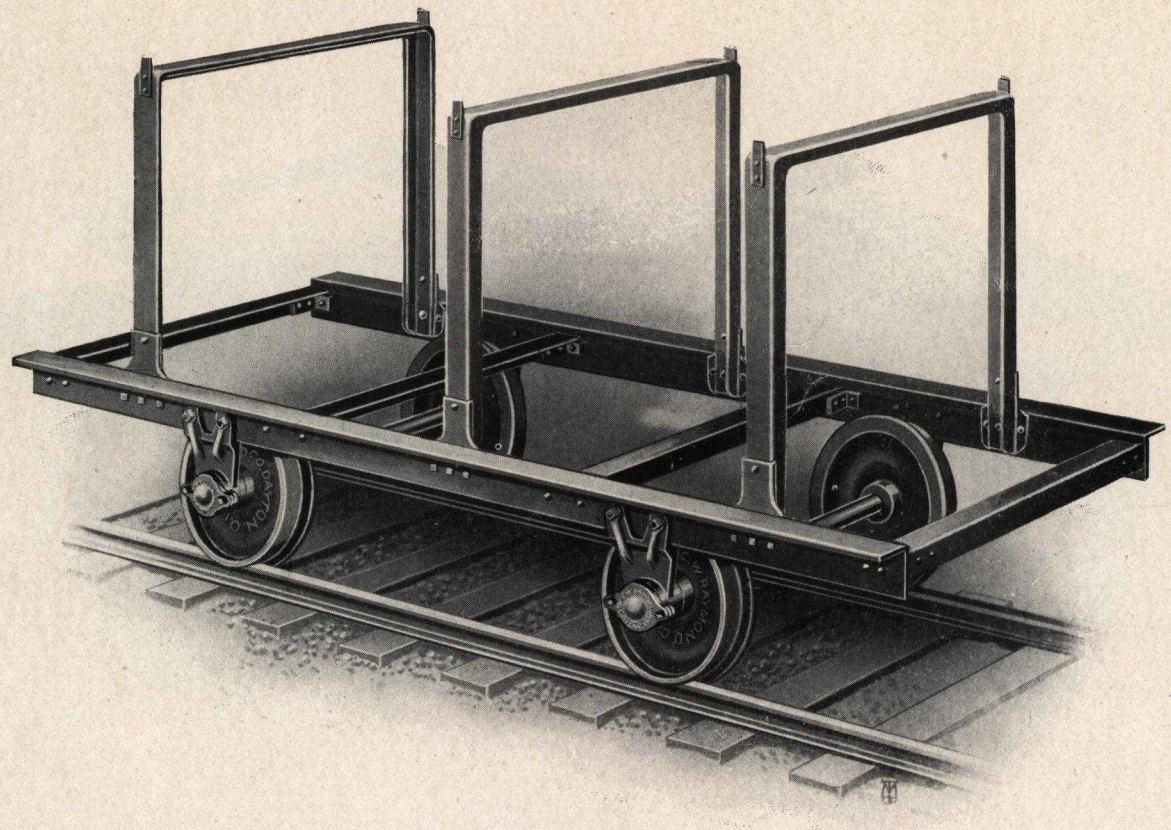
Car "A".

THIS car is for use either with steel or wooden foot pallets and is used for drying soft mud brick. This illustration shows very clearly the superstructure of all of our cars and is really the foundation upon which all of them are built. It is fitted with our standard car box as illustrated on page 155. Length 83 inches, width 35 inches, standard gauge 24 inches, approximate weight 240 pounds.



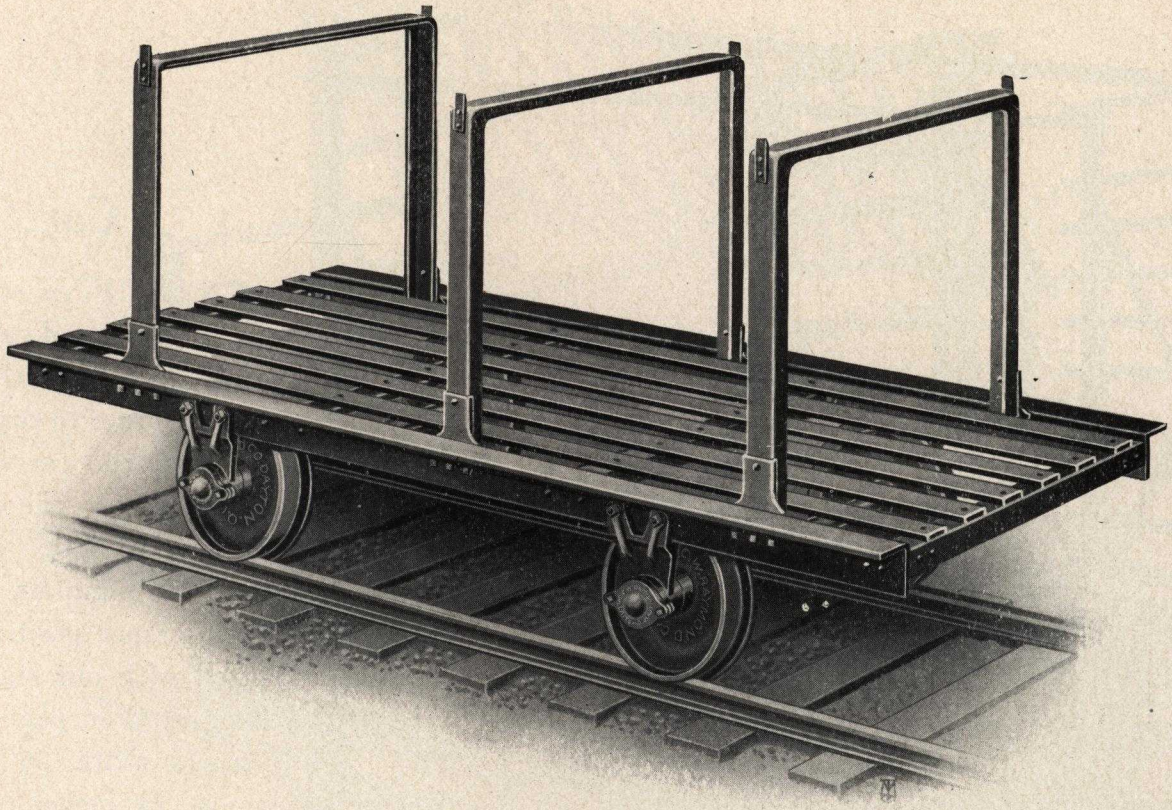
Car "B".

THIS is strictly a car for stiff mud brick, being popular where a strong plastic material is used and where the green product can be stacked several courses high without injury. It is fitted with our standard car box as illustrated on page 155. Length 83 inches, width 35 inches, standard gauge 24 inches, approximate weight 315 pounds.



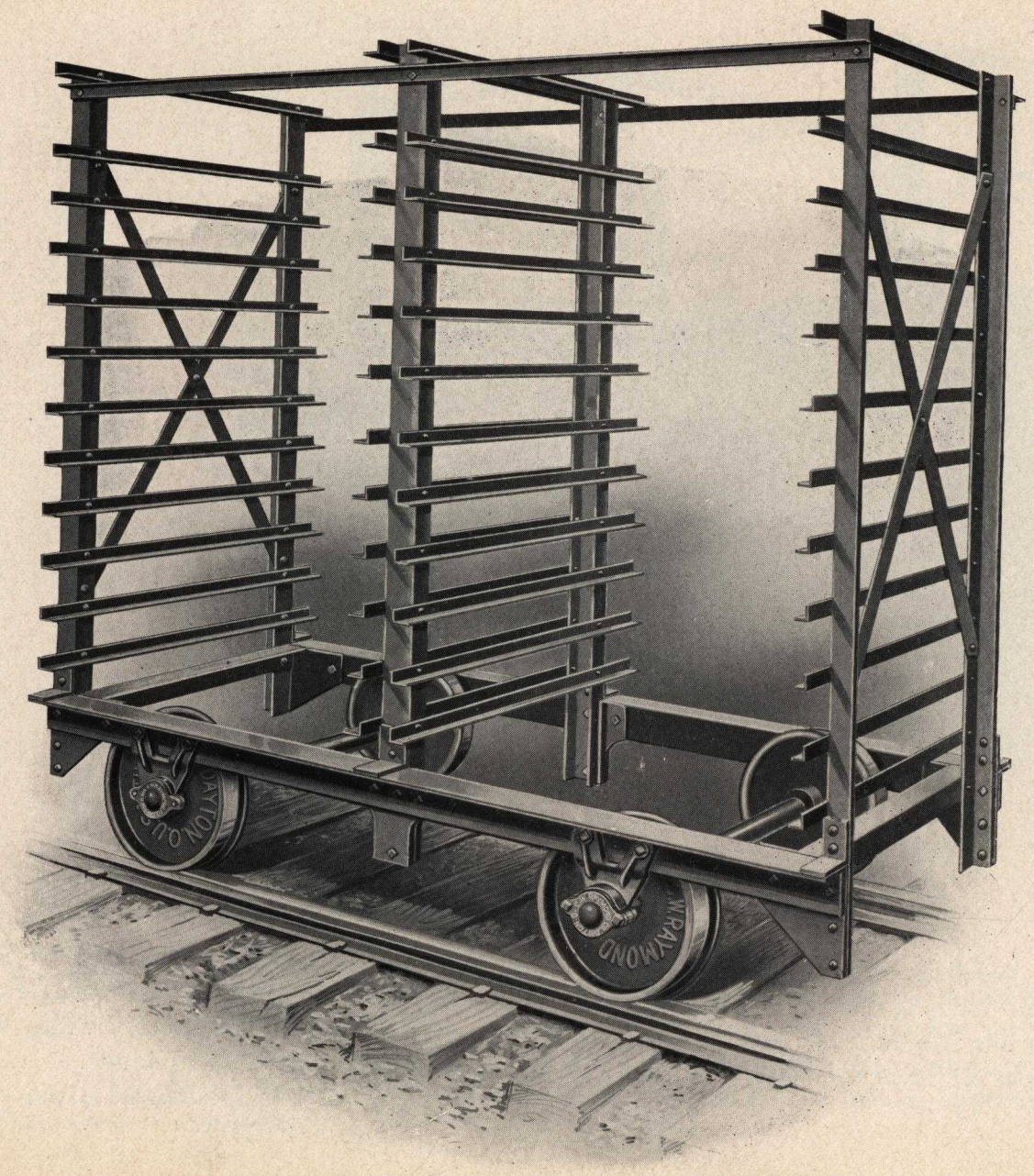
Car "C".

THIS car is built for stiff mud brick to hack four or five courses on the lower deck and four or five on the upper deck and for use with wooden decks. It is also adaptable for Fire Proofing, Holloware, etc. The distance between decks is 21 inches. It is fitted with our standard car box as illustrated on page 155. Length 83 inches, width 35 inches, standard gauge 24 inches, approximate weight 300 pounds.



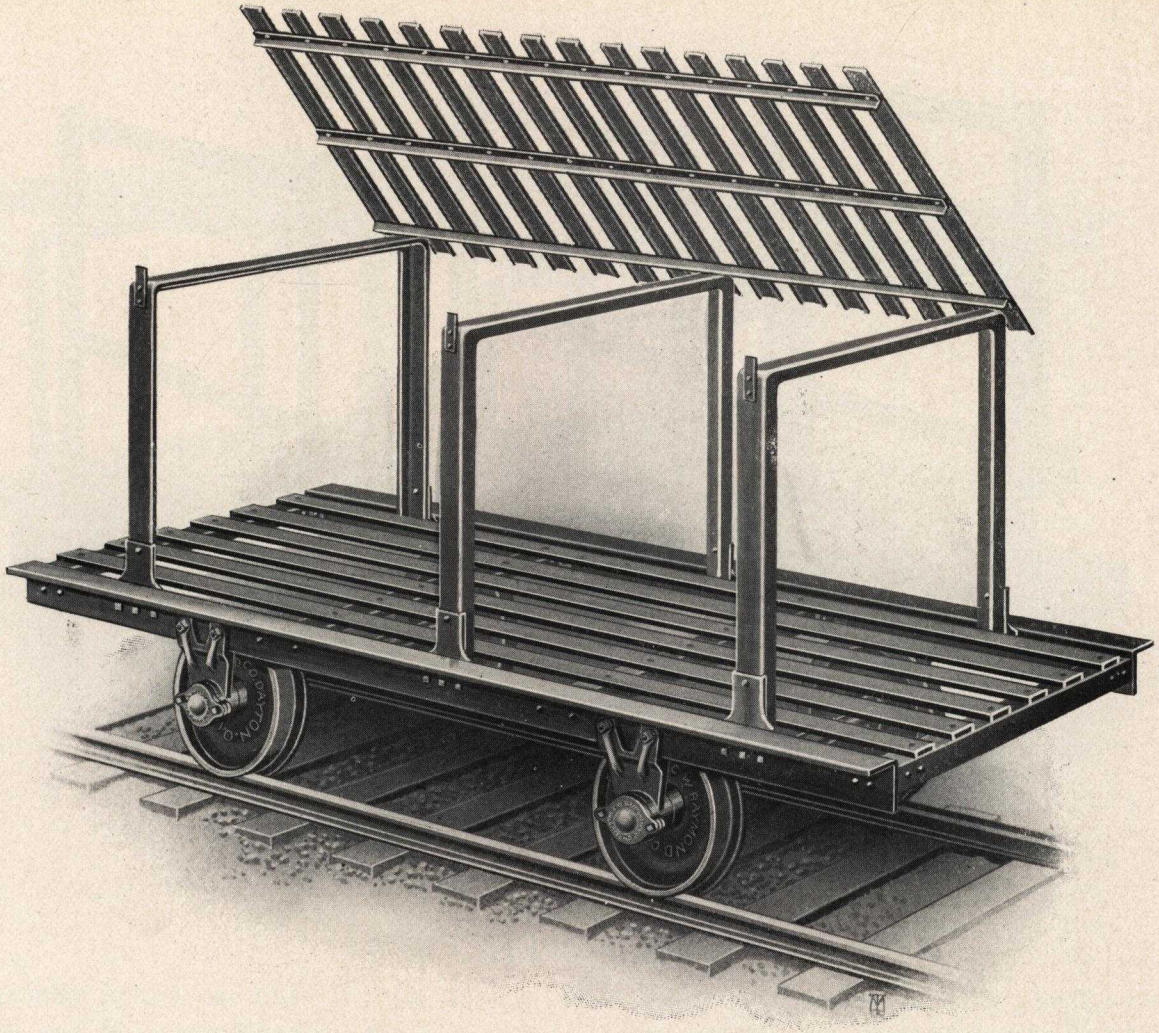
Car "E".

THIS style car is used in great numbers of stiff mud plants and has attained great popularity because of its capacity and ease of running. It is furnished with a steel lower deck, the upper deck usually being made of wood. It is also fitted with our standard car box as illustrated on page 155. Length 83 inches, width 35 inches, distance between decks 21 inches, standard gauge 24 inches, approximate weight 375 pounds.



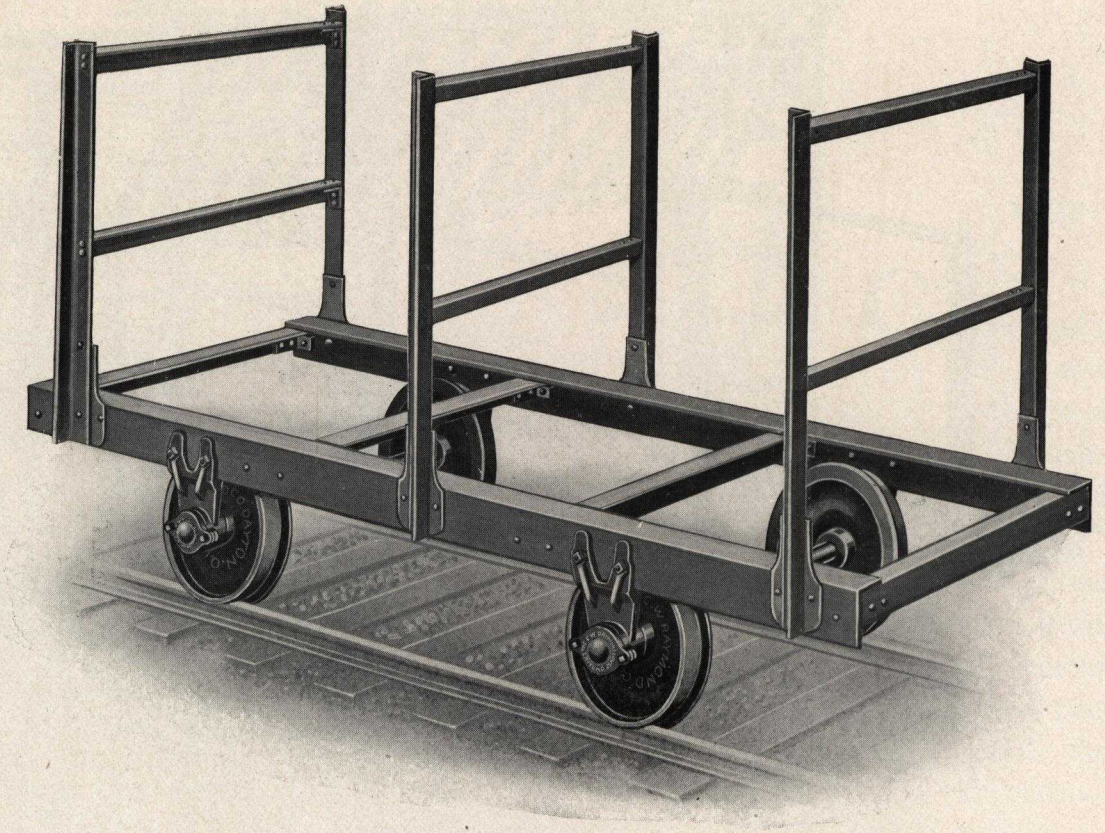
Car "F".

CAR "F" is strictly for use on soft mud yards where the pallet system is in vogue. In order to support the load at the top, the car is heavily braced throughout. The gusset plates are reversed, giving additional assistance to maintain the uprights in their proper position. This car is fitted with our standard car box as illustrated on page 155. Length 76 inches, width 36 inches, standard gauge 24 inches, distance between pallets 4¾ inches, height above rail 5 feet 10 inches, approximate weight 415 pounds.



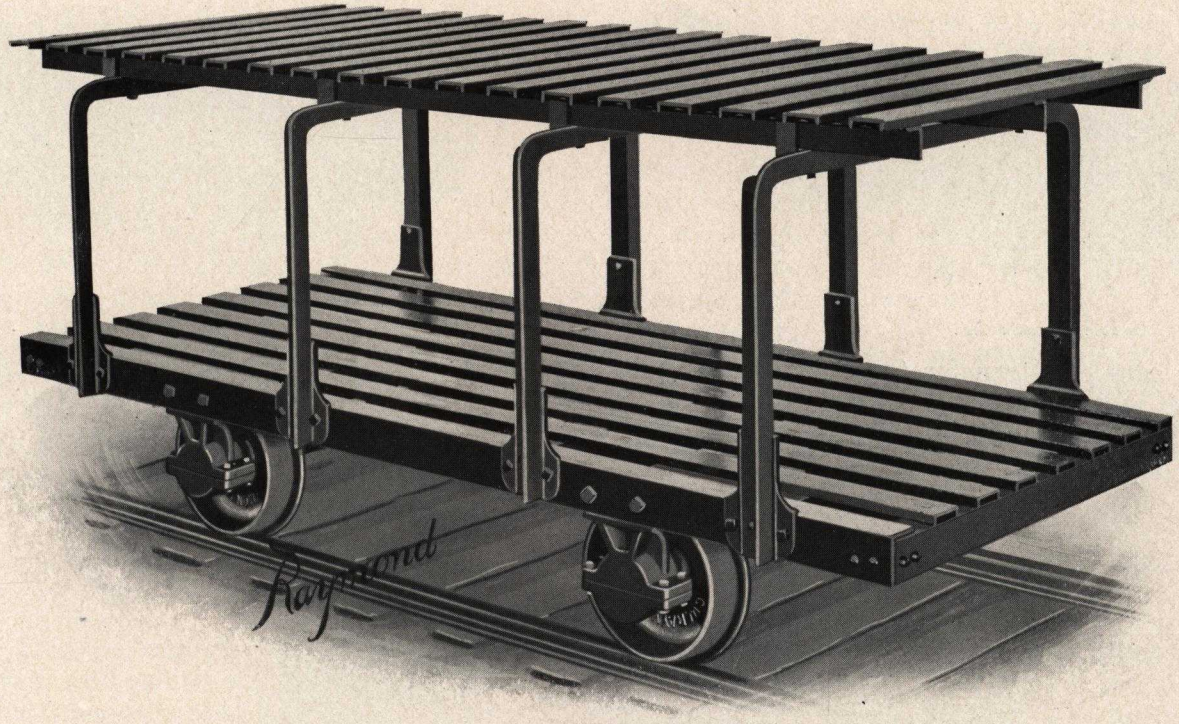
Car "G".

THIS is an extremely well liked car of good weight and proportions for use on paving brick and face brick plants manufacturing by the stiff mud process. The upper deck can be made with slats running longitudinally instead of laterally as shown. It is fitted with our standard car box as shown on page 155. The distance between decks is 21 inches, length 83 inches, width 35 inches, standard gauge 24 inches, approximate weight 485 pounds.



Car "H".

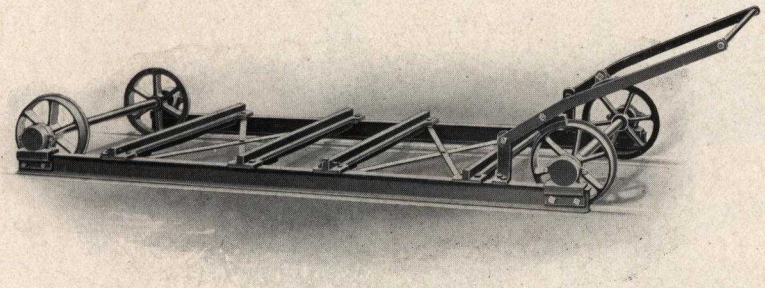
THIS car is built to handle Fire Proofing, Drainage Tile, and kindred products and is arranged for three decks. These can be made of wood or steel as desired. When funished, the middle steel deck is split and hinged allowing full clearance for loading the lower deck. It is fitted with our standard car box illustrated on page 155. Length 83 inches, width 31 inches, distance between decks 15 inches, standard gauge 24 inches, approximate weight without decks 340 pounds, with decks 635 pounds.



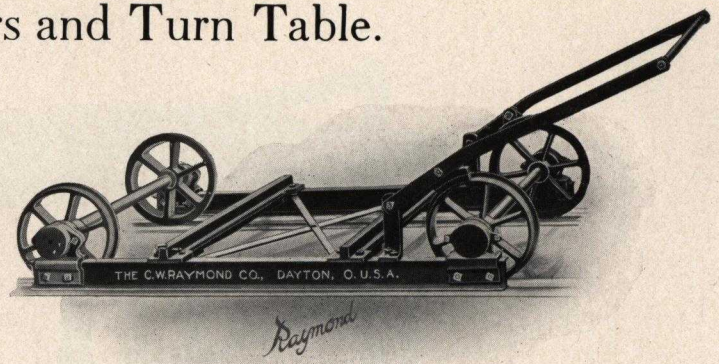
Car "J".

THIS is an especially heavy car built for the purpose of meeting the requirements on yards where the handling is very rough and is unquestionably the heaviest and most substantial car built. It has four uprights and is built for service rather than to meet competition. This illustration shows the application of the standard box to our cars. Length 83 inches, width 35 inches, approximate weight 800 pounds.

The Raymond Transfer Cars and Turn Table.

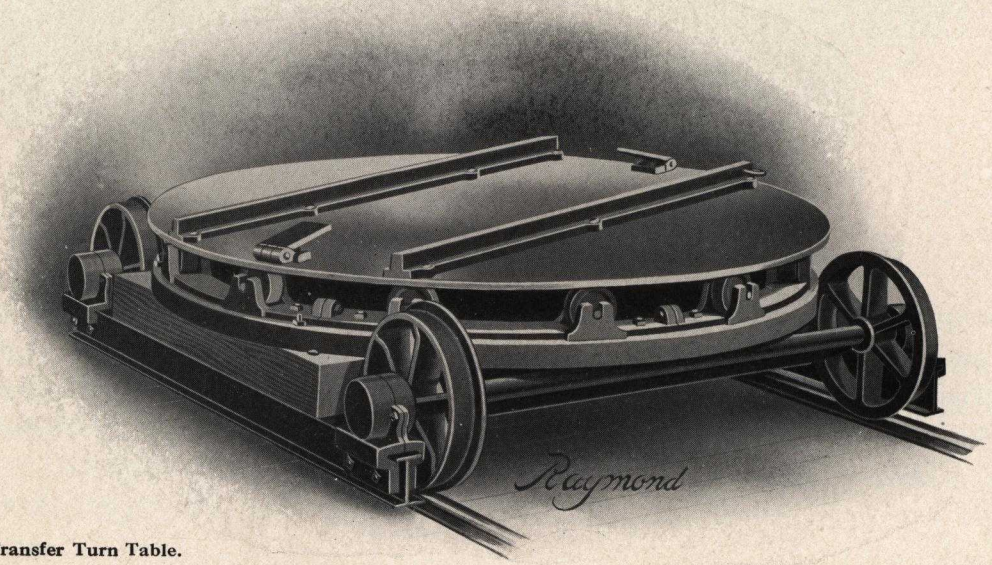


Double Transfer Car.



Single Transfer Car.

OUR transfer cars and transfer turn tables are built with care equal to our standard cars and are furnished either with or without the handle and brake as may be specified. The transfer turn table is our standard car fitted with our standard one way turn table. Special cars to meet peculiar conditions can be made on specifications in our car department.



Transfer Turn Table.

The Burning of Clay Wares.

MANUFACTURERS of brick, tile, holloware and kindred clay products are fast recognizing the fallacy of of non-progressiveness in the burning of clay wares. While they have been fully alive to the advancement made in methods of manufacturing and drying, most of them have been inclined to retain the old kiln ideas and attempt to improve the existing methods rather than adopt anything radical.

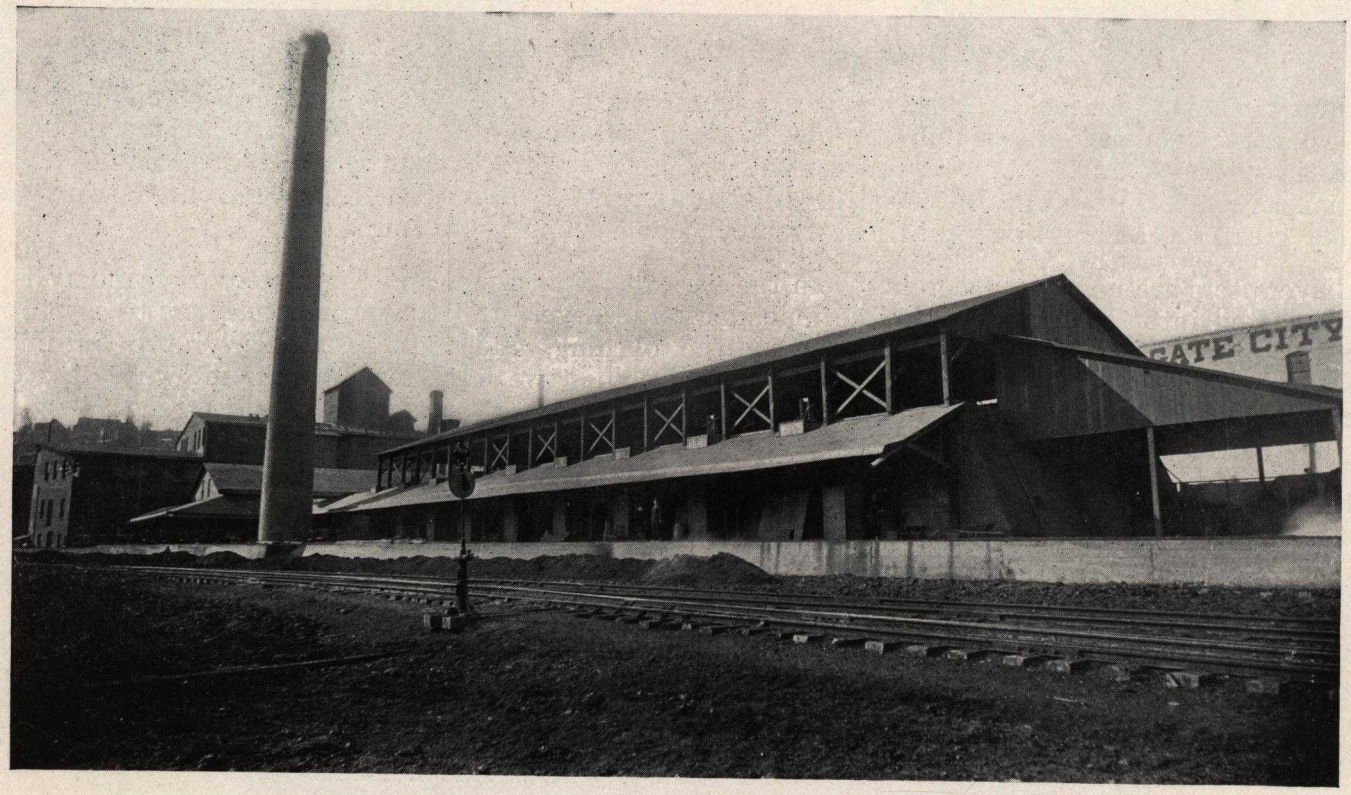
There may be some reason for this, possibly among others, the one fact that radical changes are slow of adoption, due largely to conservatism and lack of knowledge of the principles involved. It may be of interest to know that the invention of Mr. George H. Corliss was on the market 25 years before it was finally adopted in the great industrial center of Pittsburg; but even in all that time, the Corliss Engine where used was effecting an economy much greater than anything practical ever conceived along those lines.

The Claycrafters are now just emerging from the period of transition, and the matter of economy is becoming thoroughly inculcated into their minds. In the machinery and dryer, we have brought matters to a point where we may not expect a radical change for many years, but in the burning, and more particularly, the burning of large quantities of ware now being made by our high capacity machines, we have reached a point where the economical feature is paramount. While we are obtaining the economy, we are not sacrificing the finished product, but rather are including the better quality of finished product as being part of the economy.

It is the object of the pages following to show you this modern method, illustrate the truth of its principles and explain the results that we can obtain.

To the uninitiated, our claims may seem preposterous. The careful perusal of such existing records as we have been able to obtain, and which are taken from practical demonstration, will convince the skeptic and pessimist that there is at least some foundation for the figures, and our major assertion is that we can burn, by our method, with 60% less fuel than can be done in the best designed periodical direct fired kilns. Added to this, we have, in many cases, by careful handling, reduced the kiln losses to less than 2% of the ware burned. Incidental to these, we find a saving in the handling of the fuel, and at places where it may be of interest, the lack of smoke will prevent agitation by disinterested citizens on the subject of the "Brick yard smoke nuisance"

It is gratifying to learn that these economies are becoming universal, and we find many unbelievers converted into enthusiastic admirers. Another question which may be of interest to some is the matter of conservation of natural resources now being agitated in this country and also that it will be but a comparatively short time until the present known coal supply is exhausted, and that we will be driven to economical methods whether we so desire or not. When this time arrives, the competitor who has provided for it, will be prepared to meet the emergencies, but, in the meantime, he has effected a great saving to his own financial benefit.



Typical Continuous Kiln Installation. Gas Producer in the Foreground.

Advantages of Using Producer Gas.

The need of a more perfect combustion and higher temperature in furnaces, greater economy, uniformity of process and more continuous operation than obtained in direct firing of coal, led to the development and use of gas producers and producer gas fired furnaces.

In these furnaces the solid coal is converted into a combustible gas, containing practically all of the heat energy of the original coal. This gas can be conducted to any desired place for its final combustion.

The chief advantages of this proceeding are:

1. Perfect control of the combustion temperature. Both gas and air are susceptible of accurate adjustment, allowing their use in the most advantageous proportions.

2. Uniformity of temperature. As the flow of the gas from the producer is practically uniform at all times a steady heat will result. On the other hand, as both air and gas are under perfect control, increase or decrease of temperature is in the hands of the operator without changing the nature of the kiln atmosphere. Also, the temperature throughout a compartment is very uniform and the difference stays within one or two cones.

3. Fuel economy. The fuel economy results from the fact that the combustion takes place under very nearly theoretical conditions.

4. Concentration of the fuel plant. The coal is all delivered and used at one place and does not require to be carted around to different furnaces or kilns. The result is saving in labor and greater cleanliness about the factory.

5. Simplicity and convenience in operation. This results in independence from the judgment and experience of the burner to a greater extent than with any other type of kiln.

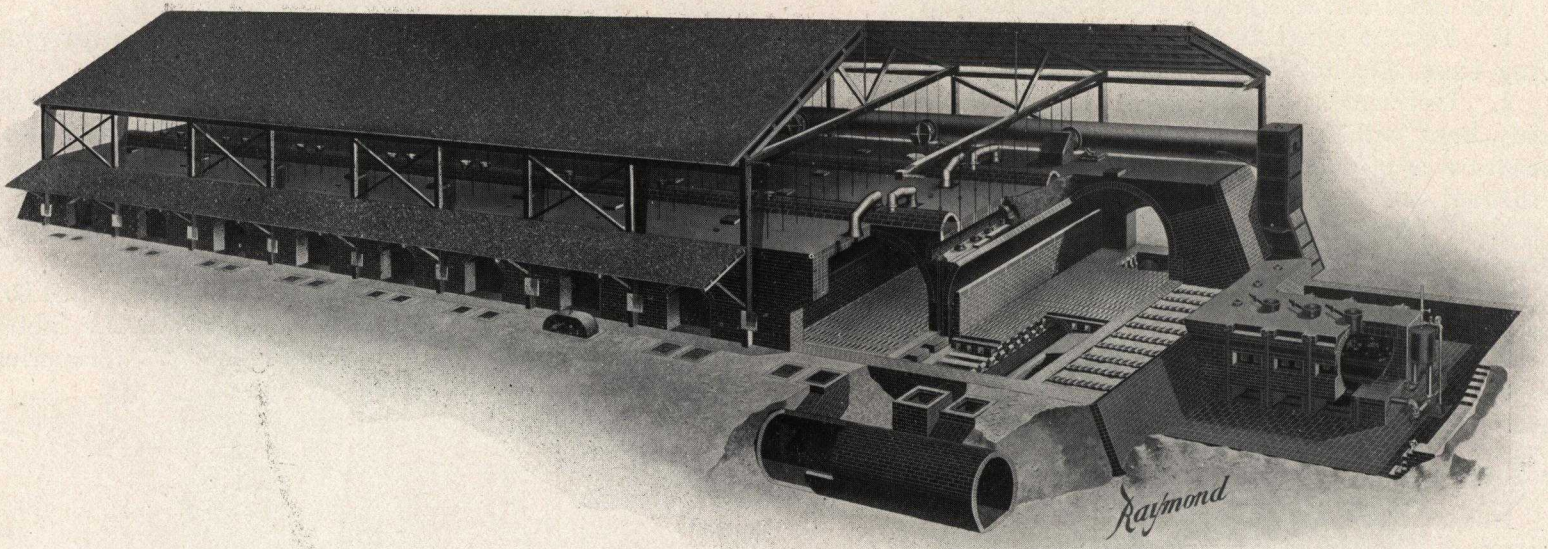
The Two Types of Kilns and their Distinct Purpose

In order to be able to furnish the most suitable kiln for any particular purpose or condition, we construct two distinct types of continuous kilns, employing the same fundamental principles in both types, but differing in the method of application.

The convenience with which the conditions in the continuous system of kilns lend themselves to an ideal application of the producer gas for fuel, has been taken advantage of in both kilns and this application has been reduced to its simplest and most efficient form.

Either type of kiln is particularly adapted to certain classes of service, and the selection of the type is to be governed by the character of the ware to be burned as well as by other local conditions.

One of the Early Types of the Continuous Kiln.



Sectional View Showing Interior of Continuous Kiln.

Covered by United States Letters Patent.

The Continuous Compartment Kiln.

This kiln is built with solid or perforated floor, according to requirements, and is especially adapted for the burning of all kinds of the better grades of clay wares that are now being burned in down draft kilns. Fire brick and fire clay blocks, face brick, paving brick, terra cotta, fire proofing, drainage tile, sewer pipe, all these find the most favorable conditions. Common brick, of course, can also be burned to advantage in this kiln.

The Continuous Tunnel Kiln.

This is a more simple type and also cheaper in construction. In its simplest form it is particularly adapted for burning common brick. Its higher developed design, however, is adapted to the requirements of face brick, fire proofing, drainage tile, roofing tile, etc. Standard size fire brick and shapes can also be burned in this kiln, as a high and uniform temperature can be obtained with ease.

Description of the Compartment Kiln.

The kilns consist of communicating compartments, or burning chambers, varying in number from 12 to 20 and arranged in two parallel rows on either side of the central draft flue, or in one continuous row with a return flue, as the physical conditions of the location may require.

In the first type, the end compartment of one row communicates with the corresponding end compartment of the opposite row by means of a transverse flue, so that the whole forms an endless circuit of communicating kilns, arranged in the closest possible proximity to each other.

In the other type, the end compartments are connected by a return flue which forms the entire system into one continuous circuit.

The bottoms of the compartments are provided with a series of collecting flues which are in damper controlled communication with the main draft flue. Adjacent compartments communicate with each other by means of passages in the foot of the partition walls, which serve to carry the air or waste gases, as may be the case, from one compartment to the other.

A gas distributing flue for each compartment is located between the spandrels of the main arches and above the division walls.

From these distributing flues downtakes are arranged to conduct the gas to the proper places, where it meets with the preheated secondary air. Each of these downtakes is provided with a valve which allows a minute regulation and enables the operator to obtain perfect distribution of the gas to any point of the compartment.

One end of the gas distributing flue is equipped with an uptake which can be connected with the main gas flue by means of a portable hood. This main gas flue is ordinarily located on top along one side of the kiln.

The water smoking flue is usually placed on top of the kiln and proper provisions are made for connecting any two compartments with each other.

The main gas flue at one end is connected with a gas producer of suitable design for the various kinds and grades of fuel, such as bituminous coal, lignite, peat, etc.

Table No. 1

Operation of Patented Continuous Producer Gas Fired Compartment Kiln.

14 Compartment Kiln	16 Compartment Kiln.	18 Compartment Kiln.
1 Full fire, gas on	Full fire gas on	Full fire
2 Red	Red	Red
3 Dark red	Dark red	Dark red to dark, connection to fan.
4 Connection to Fan	Just showing red	Just showing red
5 Water smoking from No. 14 to 300° F.	Connection to Fan	Connection to Fan
6 Water smoking from No. 13 to 150° F.	Water smoking from No. 13 to 300° F.	Water smoking from No. 13 to 300° F.
7 Setting	Water smoking from No. 12 to 150° F.	Water smoking from No. 12 to 150° F.
8 Emptying or Setting	Setting	Setting
9 Emptying	Empty or Setting	Emptying or Setting
10 Doors all open.	Emptying	Emptying
11 Doors broken top and bottom	Doors all open	Doors all open
12 Doors broken at bottom	Doors broken top and bottom	Doors broken top and bottom
13 Dark red	Doors broken at bottom	Doors broken at bottom
14 Red	Cooling with closed doors	Cooling with closed doors
15	Dark red	Cooling with closed doors
16	Red	Cooling with closed doors
17		Dark red
18		Red
11 days	13 days.	15 days
7 comp. per week	7 comp. per week.	7 comp. per week
24 hrs. gas per compartment	24 hrs. gas per compartment.	24 hrs. gas per compartment
For ordinary ware, 7 days	For face brick, all sizes drainage tile, fire brick and blocks, fire proofing, terra cotta, roofing tile, etc.	FOR SEWER PIPE AND PAVING BRICK.
9 compartments per week		
18-20 hrs. gas per compartment for small drainage tile or holloware.		

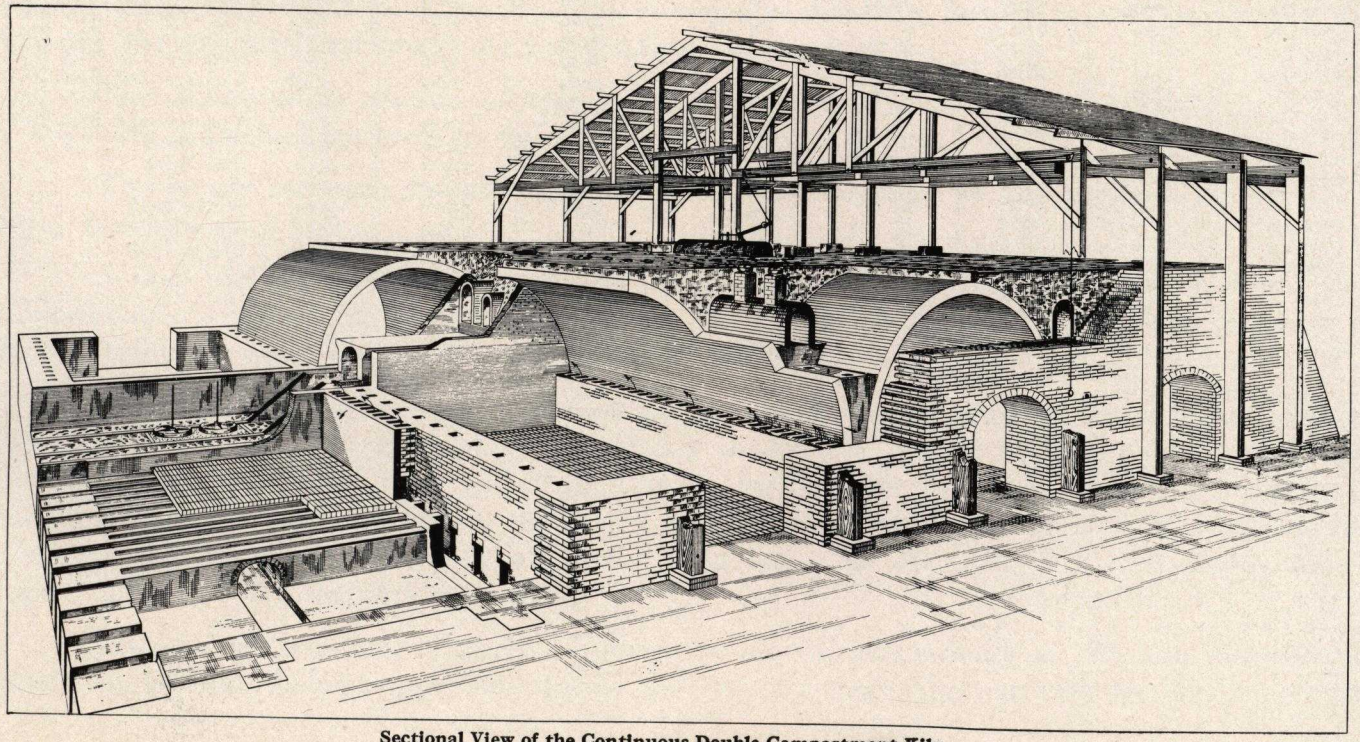
Operation of the Compartment Kiln.

The principles involved in the operation of a compartment kiln may be illustrated by table No. 1, which applys to kiln dry ware. Dry press brick may be set directly in the kiln from the press, but in this case require three days for water smoking, necessitating a change to that effect.

In further explanation of the table, it may be added that before setting a compartment with brick, a paper is put air tight over the bags or flash walls, thereby arresting the communication with the adjoining compartment.

The freshly set brick are then freed from all moisture by heating them with pure, warm air, gradually increasing their temperature until the water smoking process is completed. This hot air is taken from the cooling compartments and brought from them by means of the above mentioned water smoking flue. This procedure eliminates all danger of scumming and other discolorations.

It will also appear from the diagrams that the heating up and cooling processes are conducted very slowly and in gradual progression. Thereby the quality of the ware is benefited while the highest possible utilization of the available heat is obtained.



Sectional View of the Continuous Double Compartment Kiln.

The ware, at the time it is subjected to the direct action of the fuel, has already attained a temperature of from 350° to 400° F. below the finishing point, while the waste gases leave the kiln at a temperature of about 300° F. Also the secondary air at the point where it meets with the gas is in a highly incandescent state.

Table No. 2

Fuel Consumption.

Pos.	Unit	Weight of Unit	Burning Temperature Deg. C.	Deg. F.	Cone.	Lbs. Coal of 7000 Cal. 12600 BTU.	Total Heat Supplied M Cal.	M BTU.	Per 100 lbs. Ware Lbs. Coal	
1	1 M	6000 lbs.	1000	1832	08–07	330 lbs.	2310	4158	5.5*	Common and Face Brick
2	1 M	6000 lbs.	1050	1922	05	360 lbs.	2620	4716	6.0*	Common and Face Brick
3	1 M	6000 lbs.	1100	2012	03–02	390 lbs.	2730	4914	6.5*	Common and Face Brick
4	1 M	6000 lbs.	1150	2102	1	450 lbs.	3150	5670	7.5*	Common and Face Brick
5	1 M	6000 lbs.	1200	2192	3–4	570 lbs.	3990	7182	9.5†*	Common and Face Brick
6	1 M	6000 lbs.	1250	2282	6	690 lbs.	4830	8694	11.5†*	Common and Face Brick
7	1 M	6000 lbs.	1300	2372	8–9	780 lbs.	5460	9828	13.0†	Common and Face Brick
8	1 M	7000 lbs.	1330	2426	10	980 lbs.	6860	12348	14.0†	Fire Brick
9	1 M	7000 lbs.	1370	2498	12	1085 lbs.	7595	13671	15.5†	Fire Brick
10	1 M	7000 lbs.	1400	2552	13–14	1155 lbs.	8085	14553	16.5†	Fire Brick
11	1 M	7000 lbs.	1450	2642	16	1260 lbs.	8820	15876	18.0†	Silicia Brick
12	1 M	7000 lbs.	1490	2714	18	1400 lbs.	9800	17640	20.0†	Silicia Brick
13	1 M	7000 lbs.	1530	2750	20	1540 lbs.	10780	19404	22.0†	Silicia Brick.
					SALT GLAZED SEWER PIPE					
	1 ton	2000 lbs.	1310	2390	9	600 lbs. per ton	4200	7560	30.0	

* Vitrified Paving Brick, etc., require about 1½% more.

† These figures are average, and show from 1% to 2% higher than the best results obtained (non-vitrified ware.)

These considerations will be sufficiently clear to account for the results obtained in this kiln in regard to fuel consumption, as shown in table No. 2.

Special attention is here called to the novel arrangement introduced in this kiln for control and equalization of the heat in the burning compartments which are the key to the success of the kiln.

The producer gas passes from the main gas flue to the distributing flues and a series of downtakes. Behind the flash walls or bags the gas and secondary air meet, mix thoroughly and ignite, resulting in the desired long flame which issues from the bags and passes through the ware. The unfailing flow of the gas and air, and the great uniformity of the heat therefrom result in a uniform burn of the ware, such as to bring the losses attributable to insufficient heat within the limits of from one to five per cent.

Another simple device which enters into play at this stage, and which contributes very largely to the convenience in operating the kiln, is the attachment which enables the burner to manipulate the gas valves while he is looking into the kiln and observing the condition of the heat.

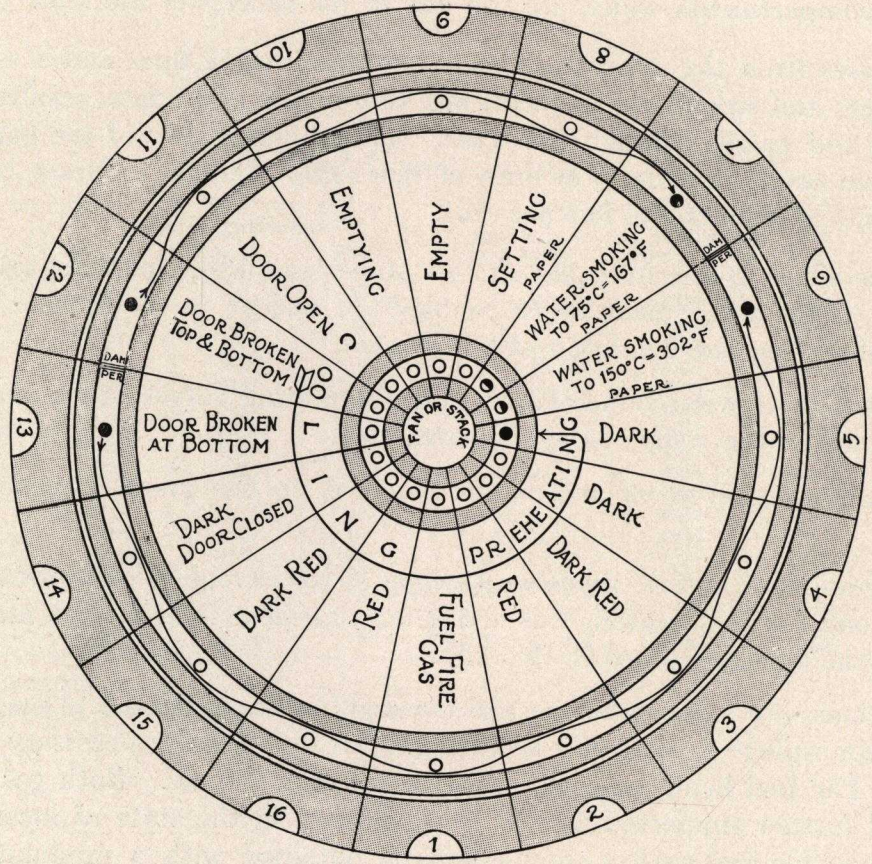
This arrangement consists of wire connections to all distributing valves which run over small rollers down to a keyboard near the peep holes in the walls of the compartments.

The burner can turn the gas on or off and adjust the heat to the greatest accuracy without taking a step away from the peep hole.

A man will bestow more care and do more work when it is convenient and pleasant to execute than he will under contrary conditions, and for that reason, this simple arrangement is in a large measure contributory to excellent and uniform quality of the burns obtained in this kiln.

Under normal conditions, i. e., when the gas and air supplies are regulated to meet in the proper proportions, the character of the kiln atmosphere is perfectly oxidizing. All the agencies necessary for this are the most favorable in the gas fired kiln. The fuel being gaseous, easily mixes with the air. Both gas and air being hot, combustion is rapidly effected and further supported by the brick already in the state of incandescence. All these points work together and make it possible that perfect combustion be obtained with a minimum amount of secondary air (about 1.2 to 1.3 the theoretical amount.)

Should it be required, however, to obtain a reducing atmosphere in the kiln periodically for the purpose of producing certain chemical reactions during the burning stage, this can very readily be accomplished. The air and



Graphic Diagram Showing Progressive Operation.

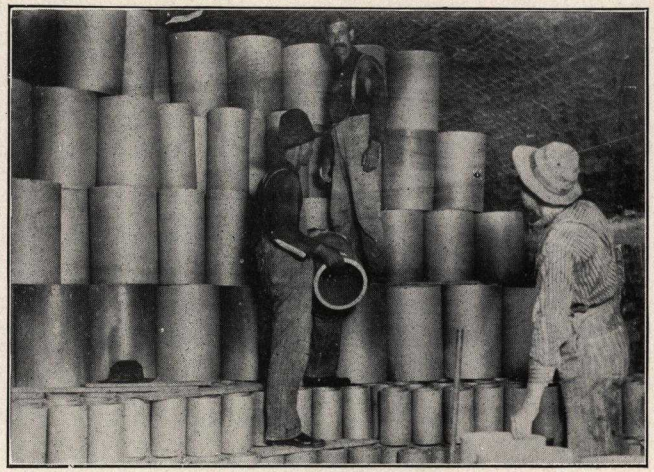
gas supply being capable of independent regulations these mediums can be brought together in any desired proportion, thus allowing the creation of a reducing atmosphere of any degree of intensity and of any duration. The composition of the kiln atmosphere can be changed from a general prevailing oxidizing character to a neutral or more or less powerful reducing character by a simple manipulation of the valves. The reduction can be accomplished in the finishing compartment, without subjecting the ware ahead to reducing conditions. This feature of the kiln is especially valuable for the burning of flashed face brick and wares of a similar nature.

Inasmuch as this class of brick and other clay wares require different treatment during the various stages of water smoking, oxidation and burning, it is impossible to lay down iron-clad rules for the operation of the kiln that would be applicable to all cases; but the general principles may be applied to all conditions, and under the guidance of ordinary intelligence, the kiln can successfully cope with any special problems that may have to be considered at any stage of the operation.

Capacity of the Compartment Kiln.

The most convenient sizes in which this kiln is built and the approximate capacities are shown below. The number of compartments required is determined mainly by the character of the ware. Tenderness on heating up or liability to cracking during the cooling process will call for a greater number of compartments than when the material will stand rapid heating and cooling.

The larger the daily capacity of the kiln, the more economical it will be in regards to cost of construction, as well as cost of operation per unit of capacity.



Setting Drainage Tile.

Table No. 3

Average Amount of Ware Per 1 Cubic Foot Setting Space of Kiln.

Common Building Brick: 14.

Face Brick, Standard Size: 12-14.

Face Brick, Roman: 14.

Fire Brick, Standard Size: 11-12.

Fire Brick, blocks: about 100 lbs. burnt weight.

Fire Clay (grog)—75 lbs. burnt weight.

Drainage Tile: 4 tile of 4″ inside dia. 12″ long each, 7 lbs. burnt weight. (green about 6″ outside dia.,) or 71.5 cu. ft. per ton.

Other sizes in proportion (average 100 lbs. tile—3.75 cu. ft.)

Hollow Tile Fire Proofing: 5″ x 12″ x 12″ tile—19 lbs. burnt weight, 2 per 1 cu. ft. or 38 lbs. per cu. ft., or 53 cu. ft. per 1 ton.

Other sizes in proportion, (from about 25 lbs. per cu. ft. or 80 cu. ft. 1 ton upward).

Sewer Pipe: 1700 lbs. to 1850 lbs. per 100 cu. ft. for large pipe only, or 107 to 108 cu. ft. per 1 ton.

For large pipe only: less weight. For small pipe only: more weight.

Paving Brick: 7 lbs. brick burnt weight: 11 ($2\frac{3}{4}$″ x 4″ x $8\frac{1}{2}$″),
9 lbs. block, burnt weight: 8 ($4\frac{3}{16}$″ x $3\frac{1}{2}$″ x 9″).
10 lbs. block, burnt weight: 7 ($4\frac{3}{16}$″ x 4″ x 9″).

Roofing Tile: 8 to 9.

Holding Capacity of Compartments.

20 FOOT KILN.

Chamber—16′—0″ wide (incl. 18″ for bags.)
Chamber—12′—0″ high.
Chamber—20′—0″ long.
140 sq. ft. available area.
140 x 20—2800 cu. ft. Setting Space.
2800 x 8—22400 9 lb. Pavers or Roofing Tile.
2800 x 11—30800 7 lb. Pavers or Standard Fire Brick.
2800 x 12—33600 Face Brick.
2800 x 14—39200 Common Brick.
2800 x 28 lbs.—78400 lbs. Drainage Tile (2.2 tons per 1 ft. length.)
2800 x 38 lbs.—106400 lbs. Fire Proofing.
2800 x 17.5 lbs.—49000 lbs. Sewer Pipe.

30 FOOT KILN.

Chamber—16′—0″ wide (incl. 18″ for bags.).
Chamber—12′—0″ high.
Chamber—30′—0″ long.
140 sq. ft. available area.
140 x 30—4200 cu. ft. Setting Space.
4200 x 8—33600 9 lb. Pavers or Roofing Tile.
4200 x 11—46200 Fire Brick or 7 lb. Pavers.
4200 x 12—50400 Face Brick.
4200 x 14—58800 Common Brick.
4200 x 28 lbs.—117006 lbs. Drainage Tile.
4200 x 38 lbs.—159600 lbs. Fire Proofing.
4200 x 17.5 lbs.—73500 lbs. Sewer Pipe.

Table No. 3 (Concluded)

40 FOOT KILN.

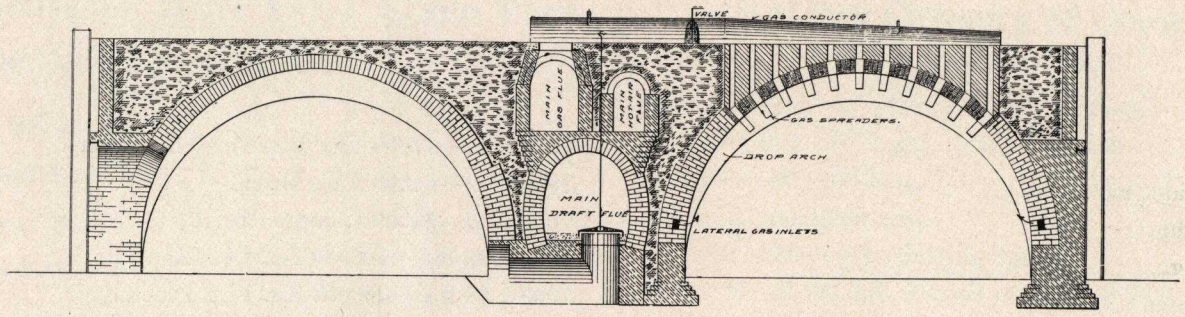
Chamber—16′—0″ wide (incl. bags.)
Chamber—12′—0″ high.
Chamber—40′—0″ long.
140 sq. ft. available area.
140 x 40—5600 cu. ft. Setting Space.
5600 x 8—44800 9 lb. Pavers or Roofing Tile.
5600 x 11—61600 Fire Brick or 7 lb. Pavers.
5600 x 12—67200 Face Brick (corr.78400 daily machine capacity).
5600 x 14—78400 Common Brick.
5600 x 28 lbs.—156800 lbs. Drainage Tile.
5600 x 38 lbs.—212800 lbs. Fire Proofing.
5600 x 17.5 lbs.—98000 lbs. Sewer Pipe.

50 FOOT KILN.

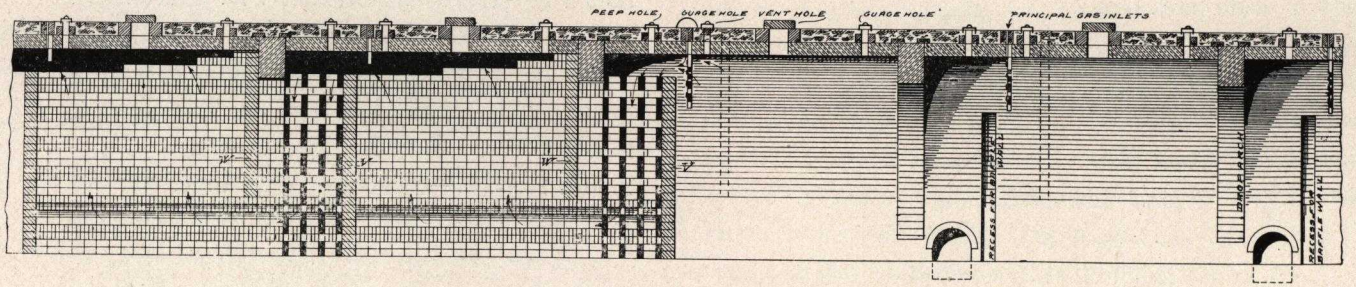
Chamber—16′—0″ wide (incl. bags).
Chamber—12′—0″ high.
Chamber—50′—0″ long.
140 sq. ft. available area.
140 x 50—7000 cu. ft. Setting Space.
7000 x 8—56000 9 lb. Pavers or Roofing Tile.
7000 x 11—77000 Fire Brick or 7 lb. Pavers.
7000 x 12—84000 Face Brick.
7000 x 14—98000 Common Brick.
7000 x 28 lbs.—196000 lbs. Drainage Tile.
7000 x 38 lbs.—266000 lbs. Fire Proofing.
7000 x 17.5 lbs.—122500 lbs. Sewer Pipe.

16 FOOT SMALL CAPACITY KILN.

Chamber—14′—6″ wide (incl.bags).
Chamber—10′—0″ high.
Chamber—16′—0″ long
100 sq. ft. available area.
100 x 16—1600 cu. ft. Setting Space.
1600 x 8—12800 9 lb. Pavers or Roofing Tile.
1600 x 11—16700 Fire Brick or 7 lb. Pavers.
1600 x 12—19200 Face Brick.
1600 x 14—22400 Common Brick.
1600 x 28 lbs.—44800 lbs. Drainage Tile.
1600 x 38 lbs.—60800 lbs. Fire Proofing.
1600 x 17.5 lbs.—28000 lbs. Sewer Pipe.



Transverse Section of Tunnel Kiln.



Longitudinal Section of Tunnel Kiln.

Description of the Continuous Tunnel Kiln.

This kiln consists of two parallel tunnels, which are connected at the ends and subdivided into sections by means of drop arches that project below the main arch at regular intervals throughout the entire length of the tunnels.

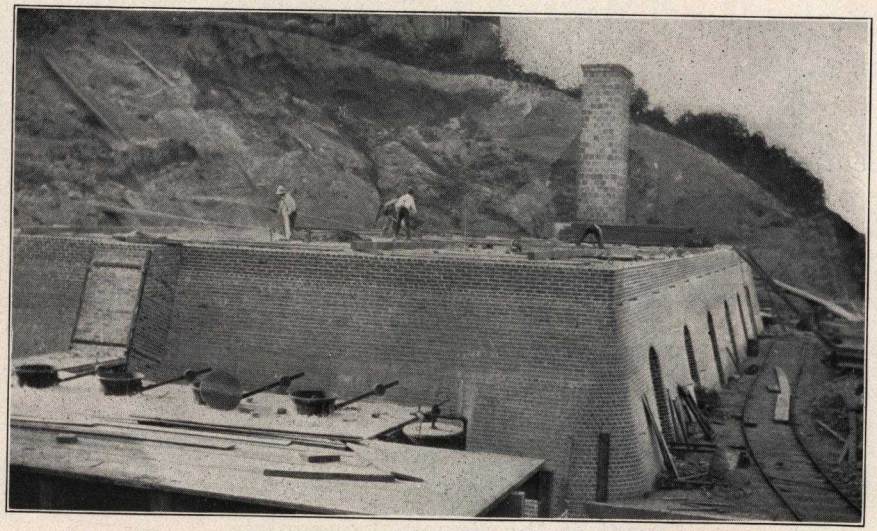
The space between the tunnels is occupied by the main draft flue, the main gas flue and the main hot air flue, as shown on the transverse section of the kiln.

Each section of the kiln is provided with a door opening, a branch draft flue, a series of principal gas inlets in the crown, and slotted recesses in the side walls for interlocking the temporary deflecting wall formed of green brick.

The principles upon which the operation of this kiln rest will be understood when reference is made to the sectional views of the kiln.

From the longitudinal section, which shows a portion of the kiln filled with brick, it will be seen that the draft is forced to travel in an upward and downward direction through each section of the tunnel, being compelled to take that course by the deflecting walls V and W, which are formed of green bricks set in tight courses across the tunnel. The draft along the floor of the kiln is facilitated by the longitudinal flues formed in the setting of the brick. Combustible gas is introduced in the tunnel and mixed with the hot air at the point where its entire volume is concentrated in passing over the lower deflecting wall V. The flames resulting from this combustion are deflected downward to the floor and into the bottom flues of the section ahead by the interposition of the upper deflecting wall W. From these flues, the flames are diverted in an upward direction by the next deflecting wall V.

The above course is taken by the air as well as the flames or combustion gases, on their passage through each of the cooling, burning or water smoking sections. The lower deflecting wall V which serves to deflect the draft upward, commences at the floor and extends up to within a short distance of the main arch, and has its ends extending into the slotted recesses in the side walls of the kiln.



Continuous Tunnel Kiln in Course of Construction.

The brick composing this wall are set angularly, for the purpose of allowing them to settle together and take up the shrinkage during the burning process, so that no openings will be formed for the passage of air through it that would lessen its efficiency for deflecting the draft.

The upper deflecting wall W, which serves to deflect the draft downward, commences on the top of the longitudinal flues, next to the rear face of the drop arch, and extends up to the crown of the tunnel.

For the purpose of obtaining an immediate and thorough mixing of the gas and air in the contracted space above the lower deflecting wall, the principal gas inlets, which are located here in a transverse row across the tunnel, are each provided with a gas spreader projecting into the tunnel. The gas enters the tunnel on the rear side of the spreader and passing around its face, is delivered into the middle of the air current. This insures proper mixing of the gas with the preheated air, resulting in the perfect combustion of the gas with the least possible amount of secondary air.

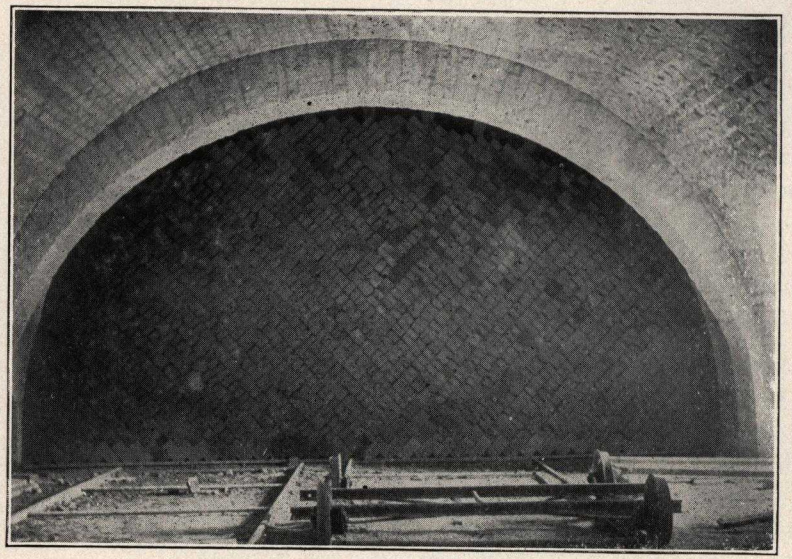
The form of this gas spreader, and the method employed in securing it to the arch, is fully illustrated. The spreader is wedge-shaped and adapted to be inserted into the gas inlet from within the tunnel, being held in position by a shim X inserted at one end of the spreader, the latter being permitted to drop inwardly and become wedged in place.

With this construction any damaged spreader can be easily removed and replaced.

Portable sheet iron gas conductors are employed for carrying the gas from the main gas flue to the gas inlets over the tunnels.

Overhead carriers are employed for resetting and transporting the gas and hot air conductors.

The temperature and condition of the air within the kiln is observed through peep holes in the arch, located immediately in front of the principal gas inlet.



Interior View of Tunnel Kiln, Showing Method of Setting Deflecting Wall V.

Operation of the Tunnel Kiln.

A paper partition or curtain is fastened across the tunnel at the end of each section and remains in position until the next section is set full and ready to take up.

When the size of each kiln section is designed to hold one day's output, and the firing is advanced at the rate of one section each 24 hours, it is obvious that there must be as many sections apportioned to a certain stage of the operation as the minimum number of days required for carrying out that stage. The following diagrams will give an idea of the method of operation of these kilns.

The manipulation of the draft valves in this kiln, for advancing the heat and water smoking of the ware in advance of the fire, is very much the same as in the previously described compartment kiln.

In the burning sections the gas is delivered into the principal gas inlets into the top of the crown through the portable conductors which contain ready means for adjusting the gas pressure, and as the combustion takes place immediately under the peepholes in front of the gas inlets, the condition of the heat is readily observed and adjusted with the greatest accuracy.

Owing to the fact that the flame develops in the upper part of the kiln, there will be a few bricks in the top of this kiln, immediately under the gas flame, burned a little harder than the balance, but as these bricks are on top, and have no superincumbent weight to carry, they are not subject to distortion, and are, therefore, simply a No. 1 hard brick.

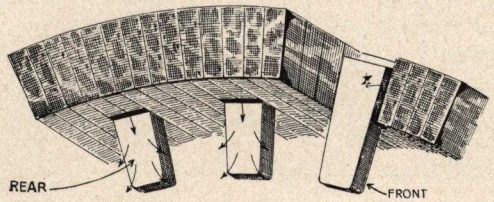
From the place of combustion the hot gases are immediately directed downward and into the bottom of the following section, heating same from the bottom up, which is found to be of particular advantage in a kiln of this type.

It is unnecessary to emphasize the fact that the bricks composing the deflecting walls become as well burned as any in the kiln.

This kiln will burn ordinary building brick with a fuel consumption of about 300 pounds of coal per M., while face brick, fire brick and other ware require proportionate quantities of fuel.

Capacity of Tunnel Kiln.

This kiln can be built for daily capacities ranging from 15 to 50 thousand brick per day.



Tunnel Kiln, Gas Spreaders.

In proportion to the capacity the larger size kilns are the most economical in regard to the cost of construction as well as the fuel economy and cost of operation.

As may be seen from the accompanying view of a 40,000 daily capacity kiln, the tunnels are large enough to give plenty of elbow room for the men engaged in setting and delivering.

Table No. 4.

Operation of Continuous Producer Gas Fired Tunnel Kilns.

18 Section Kiln	16 Section Kiln	14 Section Kiln
1 Full fire, gas on	Full fire, gas on	Full fire, gas on
2 Red	Red	Red
3 Dark red	Dark red	Dark red
4 Just showing red	Just showing red	Connection to Fan
5 Connection to Fan	Connection to Fan	Water smoking from No. 12 to 300° F.
6 Water smoking from No. 15 to 300° F.	Water smoking from No. 13 to 300° F.	Water smoking from No. 11 to 150° F.
7 Water smoking from No. 14 to 150° F.	Water smoking from No. 12 to 150° F.	Setting
8 Setting	Setting	Empty or Setting
9 Setting	Empty or Setting	Emptying
10 Empty	Emptying	Door all open
11 Emptying	Door all open	Door broken top and bottom
12 Emptying	Door broken top and bottom	Door broken at top
13 Door all open	Door broken at bottom	Dark red
14 Door broken top and bottom	Still showing red	Red
15 Door broken at bottom	Dark red	
16 Still showing red	Red	
17 Dark red		
18 Red		
13 days	13 days	11 days
7 sections per week	7 sections per week	7 sections per week
24 hrs. gas per section. For tender ware and increased capacity at times or special conditions in hot climates demanding more cooling capacity	24 hrs. gas per section For tender ware and regular conditions	24 hrs. gas per section For rough ware

Cost of Construction.

The axiom that "Whatever is worth doing at all is worth doing well," can nowhere be applied with more propriety than to kiln construction, and it has been kept in constant view in the planning of the latest designs of the Continuous Kilns.

The cutting down of a few hundred dollars on the first cost of a kiln will invariably shorten its life to a far greater extent than the saving in cost justified.

When the kiln is only an experimental affair, the lasting qualities are of no serious consequence, as the probability is that the sooner its existence is over, the better it is, but when it comes to putting up one of our Continuous Kilns, it pays to do it well.

In localities where the cost of fire brick is not prohibitive, we prefer to line the entire inside of the compartment kiln with fire brick, even when it is not used for burning refractory ware, using No. 1 quality fire brick for parts of primary importance and No. 2 quality for parts of secondary importance.

The cost of the construction of a kiln of a stated capacity will vary for different localities, being dependent upon the price of material and labor.

Inquiries.

When asking for propositions and estimates, we request that our patrons will particularly give us the benefit of the following points, which will enable us to prepare our figures intelligently and prevent unnecessary correspondence:

Kind of clay and description of its properties, especially with regard to heating and cooling.

Kinds of ware to be burned: If possible, with an account of previous experience with it in other kilns and amount of coal used in such kilns.

Amount of ware manufactured per day (machine capacity).

Size of brick in green, dried and burned state.

Weight of brick in green, dried and burned state.

Kind of coal used: Preferably, mine, analysis and data as to behavior of coal in burning.

Condition of ground on which kiln is to be erected.

Cost of labor; brick layers, carpenters and common labor.

Cost of material: common brick, fire brick, fire clay, lime, sand, cement, lumber, etc.

Any further information which should appear to be necessary will be greatly appreciated.

The Pressure Gas Producer.

United States Patent No 916,806, March 3, 1909.

THE pressure producer for supplying the continuous Kilns with gas is of circular cross section and watersealed. The blast is supplied by a Steam Blower, allowing perfect adjustment of steam and air, and requiring about 1½ pounds of steam of 60 pounds pressure per 1000 cubic feet of air. Gauges are provided to guide in the control of air and gas pressure, insuring a uniform flow and uniform quality of the gas.

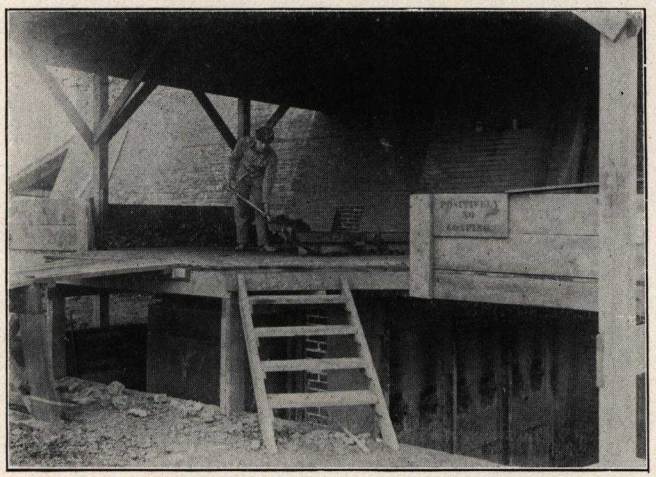
The construction of the producer is very simple and may be set below ground level or on top of ground, as the requirements may be.

SIZES AND CAPACITIES OF PRESSURE PRODUCERS.

	Diameter Inside of Lining	Area of Fuel Bed, Sq. Ft.	Capacity in 24 Hours Tons of Bituminous Coal		Diameter Inside of Lining	Area of Fuel Bed, Sq. Ft.	Capacity in 24 Hours Tons of Bituminous Coal
No. 1	9 ft.	63.60	7.5 to 12.0	No. 3	7 ft.	38.48	4.5 to 7.0
No. 2	8 ft.	50.26	6.0 to 9.5	No. 4	6 ft.	28.27	3.5 to 5.0

The Suction Gas Producer.

THE Suction Gas Producer is rectangular in shape and is provided with a water back steam generator, steam injector and hopper and bell feed. This type of producer is entirely selfcontained and does not require a special boiler to furnish it with steam. Its construction and operation is very simple and does not require as close attention as the pressure producer, however, any lack of attention in either one will produce a lower grade of gas, thereby consuming unnecessary fuel.



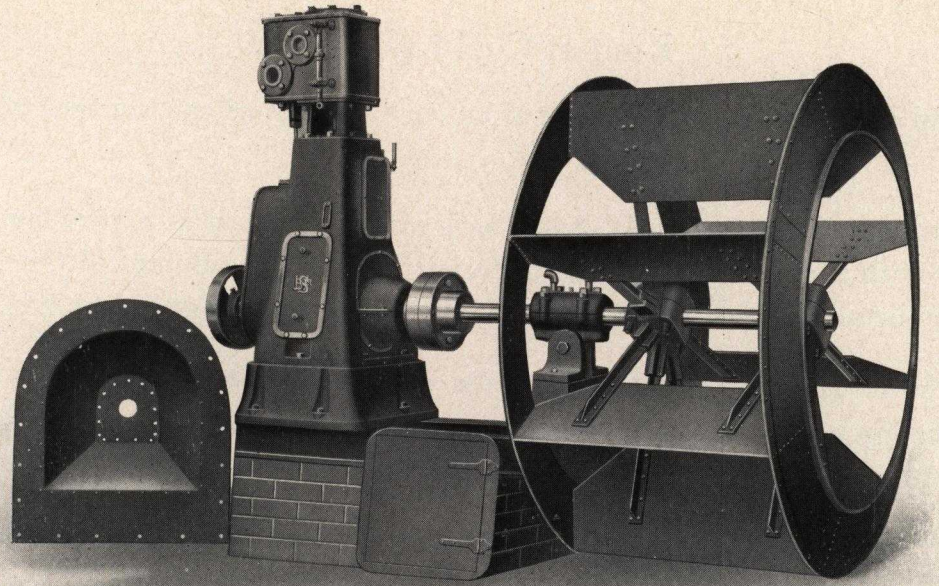
Feedin a Suction Producer.

The arrangement of the water backs in this producer serves the double purpose for furnishing the required amount of steam for gas making.

The bottom of the producer is placed about 6 feet below the floor line so that the charging platform is only 3 feet above the ground, making it very convenient to handle the coal onto the platform as well as for removing clinkers and ashes.

SIZES AND CAPACITIES OF SUCTION PRODUCERS.

	Inside Dimensions	Area of Fuel Bed, Sq. Ft.	Capacity in 24 Hours Tons of Bituminous Coal
No. 1	6 feet 9 inches x 21 feet	130	12 to 17
No. 2	6 feet 9 inches x 16 feet	100	8 to 12
No. 3	6 feet 9 inches x 11 feet	70	5 to 8



The Raymond Continuous Kiln Fan.

THE demands on a fan for forced draft in a continuous kiln are somewhat greater than any other possible service, working as they do directly in the gaseous products of combustion, sulphur fumes, etc., and a steel plate fan would corrode in a very short time.

In order to meet these conditions, we have designed a special fan for the purpose which we can arrange for either a direct connection to a vertical engine or with pulley for motor drive. This fan is made of copper blades and rims, eliminating the trouble occasioned by corrosion. The fan wheel is overhung and properly supported on grillage with a self oiling bearing, the one next to the fan being water jacketed. The engine is of the closed vertical type of sufficient power to operate the fan the required speed. The housing is built of brick not furnished by us. This is done for the reasons given above in that it would speedily corrode under the action of the sulphur fumes.

The fan has proven by actual experience to be the most successful for this class of work and we can also thoroughly recommend it for use where the Waste Heat System of drying is being used and corrosion encountered in the handling of hot gases of combustion. The size required depends on many various conditions and can only be worked out with a knowledge of these conditions.

Kind of Coal to be Used.

The coal to be used in the producer should be of as good quality as can conveniently be purchased at a reasonable price.

Slack coal or refuse should not be used. Such fuels can be obtained at a very low price, but the results will be very unsatisfactory. With these the capacity is materially reduced on account of the choking of the blast which has to be driven at high pressure to get through the fuel bed. This in turn results in overheated gas, loss of efficiency and increased labor.

As a rule, run of mine coal, crushed at the mine 4″ ring mesh will be the best to use. Nut, 1¼ to 2 screened and freed from dust, if obtainable at same price as run of mine, is most desirable.

Bituminous coals, lignites and peats may be used with advantage, with the provision that the producer be arranged to suit their different qualities. However, if high ash and high percentage of sulphur are combined, the labor of working the producer is greatly increased and simultaneously the capacity reduced. A sulphur content of up to 1 or 1½% will be harmless, but beyond this it becomes far more annoying than ash.

DEPTH OF FUEL BED.

Bituminous Coal, Mine Run	5′–0″
Bituminous Coal, Nut	4′-0″ to 5′-0″
Bituminous Coal, Pea	3′-0″ to 4′-0″
Lignite, small.	4′-0″
Lignite, coarse	5′-0″
Peat, in pieces, hard	6′-0″
Peat, in pieces, loose	8′-0″

ATTENDANCE.

The handling of the producer is simple and does not require more than ordinary intelligence and thoughtful attention. The work of the gas maker is not laborious but may become so if proper and regular attention is lacking.

Labor required per shift:

Plant of one producer,	1 gas man
Plant of two producers,	1 gas man 1 laborer half time
Plant of three producers,	1 gas man 1 laborer full time

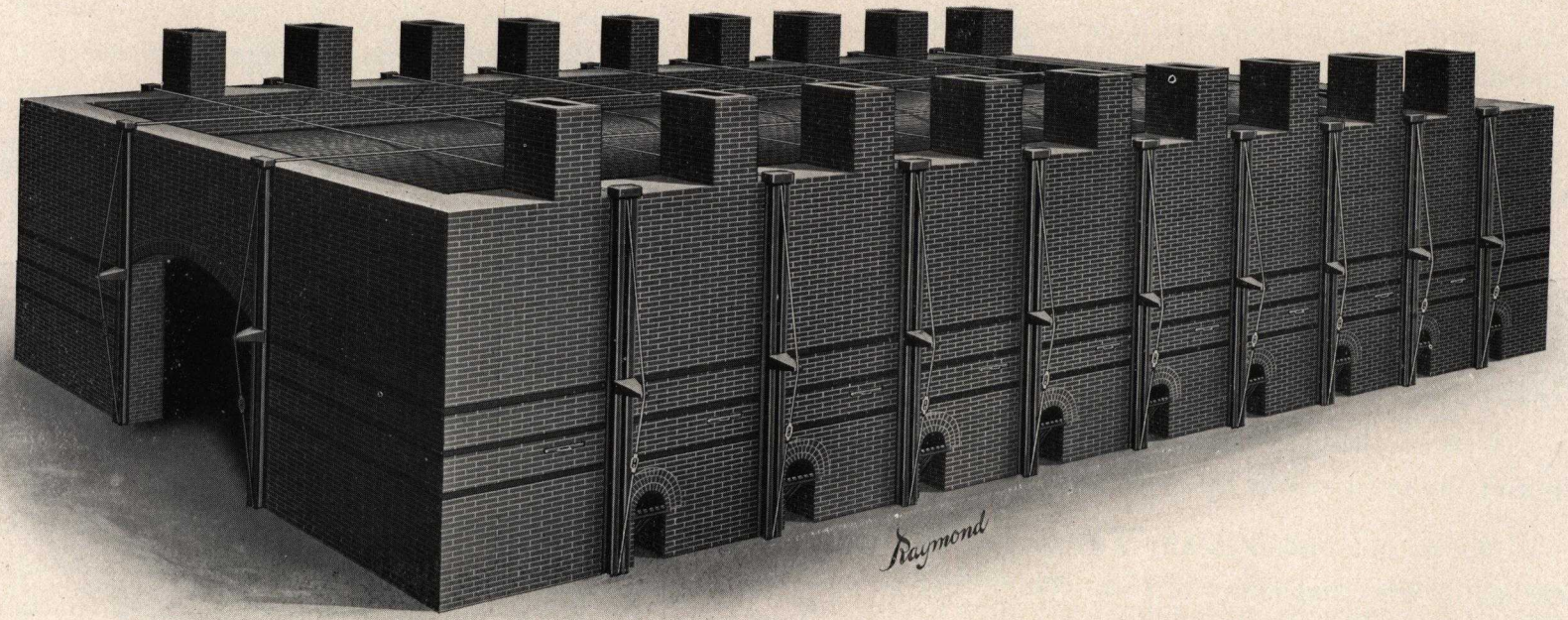
Direct Fired Periodical Kilns.

Many plants do not desire the wonderful economy effected by the producer gas fired continuous kiln, for the reason that their capacity is below the effective limits of economy of the continuous system, and further, owing to an inadequate supply of material the location may be more or less temporary.

There is another class of kiln users who prefer to use open top or up draft kilns, or possibly a few permanent down draft kilns, until they are able to make a complete kiln investment and bring their burning capacity up to the same basis as the manufacturing department, or until they are getting returns for their investment.

It is to these we address the following pages, covering the rectangular down draft kiln, the round down draft kiln and the open top or up draft kiln.

We do not intend in any way to detract from the benefits derived from either class of kiln construction, as each has its uses and many of them, but rather to inform you that we are prepared to meet your wants no matter what they may be in the way of brick kilns, and still maintaining the belief that the producer gas fired continuous kiln is the greater in economy, provided the conditions,capacity, etc., are available for it to be seen at its best.



The Raymond Down Draft Rectangular Kiln.

The Raymond Down Draft Rectangular Kiln.

Many localities give preference to the use of rectangular kilns for the burning of pavers, face brick, fire proofing, drainage tile, etc., and we present a kiln of this type for your consideration.

The kiln is built with heavy and substantial brick walls giving it longevity as great as is desired in a structure of this character, and its resistance to expansion and contraction from the high temperature, which it maintains while burning, to the coolness of the atmosphere when drawing or setting causes deterioration and destruction in a very short time if not properly provided for in the construction.

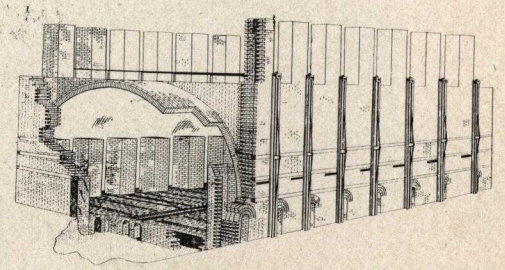
The kiln is braced its entire length and width with I beams imbedded in the brick work, which are prevented from spreading by buck stays and binder rods. These serve to tie the entire structure together, successfully resisting the extreme expansion and preventing the attendant cracking of the walls by which air is permitted to enter, prematurely cooling and cracking the ware.

Drawings and equipment are furnished for building the kiln in two sizes, known as the 9-arch and 10-arch kilns, which refers to the number of arches or furnaces on each side.

The travel of the flame is from the firebox or furnace upward through the pocket formed by the bag or flash wall to the arched crown, thence downward through the ware into ducts or flues beneath the floor, thence to atmosphere through the stack opposite the firebox. This is the direct line of travel. The spreading effect is obtained by the duct or flue of the firebox opposite, tending to draw part of the flame through it, which gives a uniform temperature throughout the entire kiln.

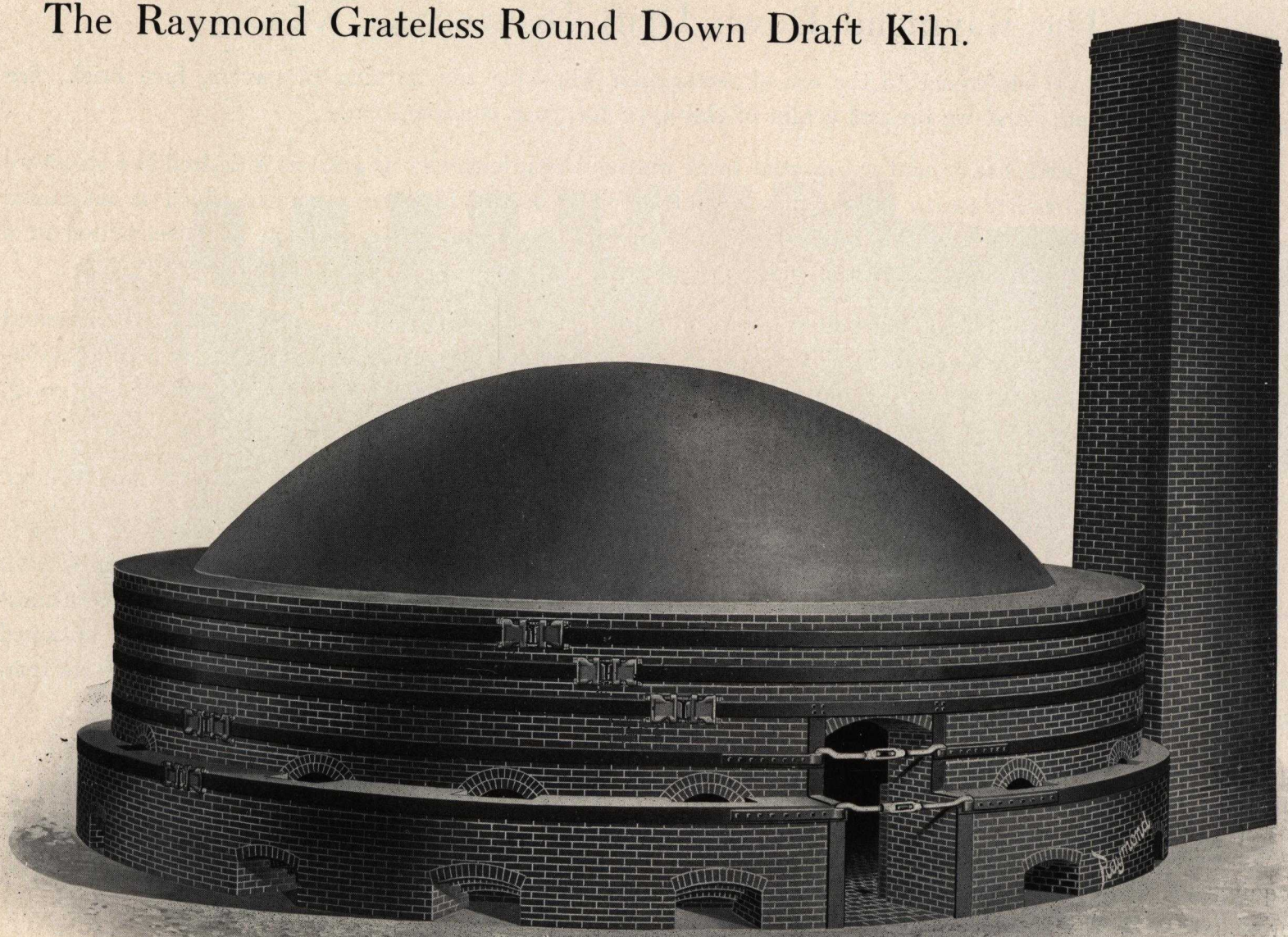
Many successful installations have been made, and the kiln is burning all classes of ware in many sections of the country under varied conditions.

We do not undertake to build the kiln but furnish working drawings and iron equipment. The total weight of the iron equipment for the 9-arch kiln is approximately 29,450 pounds, and for the 10-arch kiln approximately 33,350.



Interior Section, Rectangular Kiln.

The Raymond Grateless Round Down Draft Kiln.



The Raymond Grateless Round Down Draft Kiln.

This kiln is more popularly known as the Penn Kiln and may be built with two kilns operated with one stack.

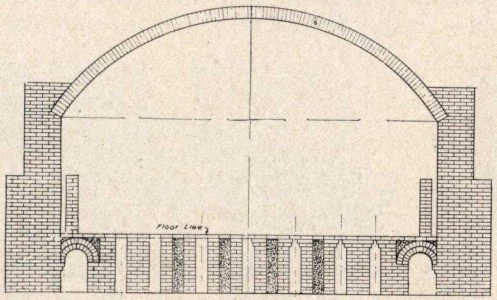
The construction of the kiln is such that it will resist the strains due to expansion under heat. The walls are thick and the crown so designed as to prevent cracking, and the bands unite the kiln into one compact structure fully capable of resisting the distortion due to the expansion and contraction.

The travel of the fire is from the firebox upward through the pocket formed by the bag or flash to the crown, which, on account of its spherical shape, tends to spread the flame so as to give a uniform temperature throughout the kiln. The flame then travels downward through the ware to a circular flue with branches, where it is conducted to a transverse flue which carries it to atmosphere through the stack.

This design of kiln has met its most pronounced success in burning the paving brick in the Ohio Valley fire clay and shale districts, and is perfectly capable of burning refractory wares as well as common brick, drainage tile, sewer pipe, etc.

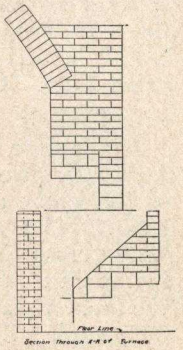
The Raymond Grateless Round Down Draft kiln is normally constructed without grate bars, this part being taken care of in the building of the fireboxes. This eliminates considerable ironwork at a point where continued expense is necessary for its upkeep. However, should it be desired, it can be designed for the use of sloping grate bars.

The equipment furnished for this kiln consists of drawings, bands, door frames, clamps for bands, etc. The following table shows the diameter, approximate weight of the equipment, and the approximate holding capacity in standard American building brick:



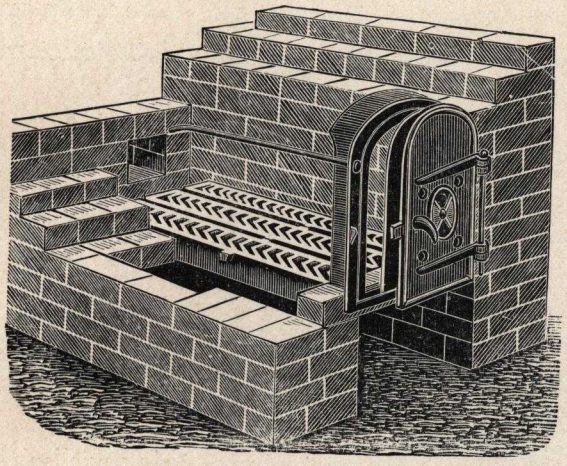
Cross Section.

Internal Diameter	Approximate Weight Pounds	Approximate Holding Capacity
24′	5300	55,000
26′	5500	67,000
28′	5750	78,000
30′	6000	90,000
32′	6300	100,000



Detail Showing Furnace

Kiln Doors, Kiln Castings, Etc.



Shows Our Kiln Door and Grate Bar as Set in Arch.

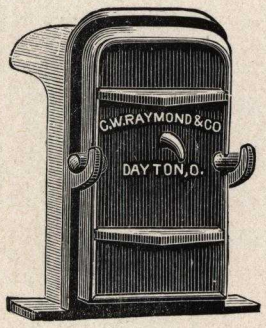
We manufacture a most complete line of Kiln Castings of all kinds. We use the very best grade of gray iron. Our facilities for the rapid execution of foundry work are unsurpassed, hence orders in that line can be filled with unusual promptness. Special prices on large quantities of castings.

KILN DOORS.

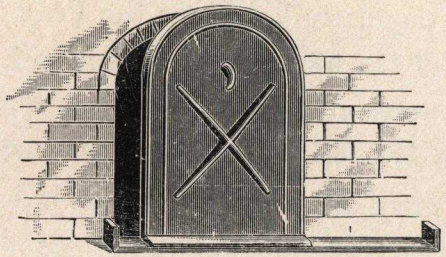
The Kiln Door is an item of economy, as it saves fuel and facilitates the work of burning. We keep in stock the four styles illustrated in this catalog. These are in most general use. Other styles made to order.

No. 5.

The door here shown is commonly used for burning wood. The door is independent of the frame and can be easily lifted therefrom. It has a ventilator in the center and heavy cross ribs on the inside, not shown in the cut. The frame extends well into the arch. Opening 12 by 20 inches. Weight, 80 pounds.



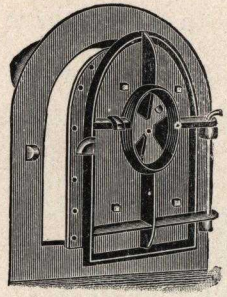
No. 5 Kiln Door.



No. 10 Kiln Door.

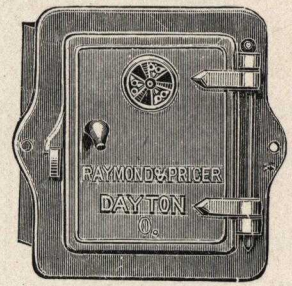
No. 10.

This door opens or closes the arch by sliding on its base below. No frame is used, the arch being turned with brick. We furnish the slide-iron upon which the door rests. Weight, including slide-iron, 85 pounds. Size of door, 16 by 18 inches.



No. 15 Kiln Door.

Opening, 12 by 14 inches.
Weight, with Liner, 60 pounds
Weight, Plain, 50 pounds.



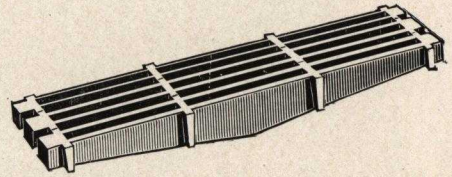
No. 20 Kiln Door.

Opening, 12 by 14 inches.
Weight, with Liner, 50 pounds.
Weight, Plain, 35 pounds.

The above two doors are preferable with liner plates, as these afford complete protection to the door, and, if burned out, can be renewed at a small cost.

Regular Grate Bars.

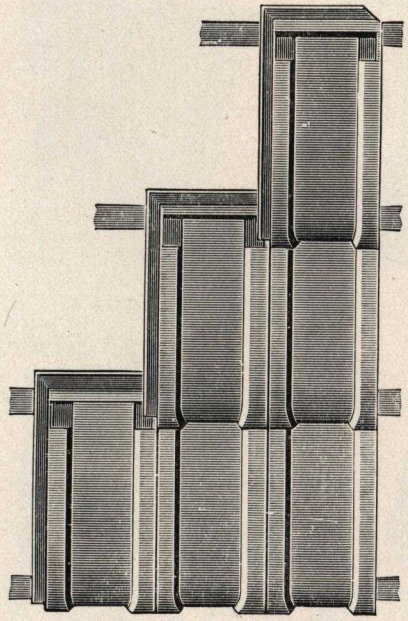
We keep in stock and can usually ship promptly regular Grate Bars as follows:



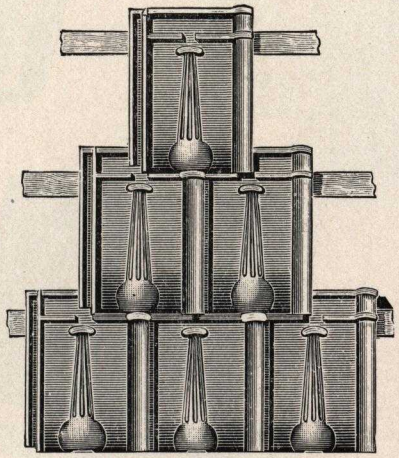
Length	Width	Ap. Wt.	Length	Width	Ap. Wt.	Length	Width	Ap. Wt.
3 ft.	2½ in.	26 lbs.	3 ft. 6 in.	2¼ in.	30 lbs.	4 ft.	2½ in.	35 lbs.

Roofing Tile Designs.

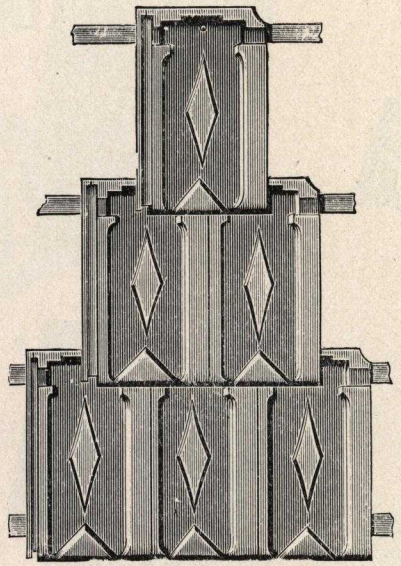
These types and many other styles are being successfully made on the Raymond Roofing Tile machinery and in various parts of the country. Many other styles have been made and special designs can be made to order.



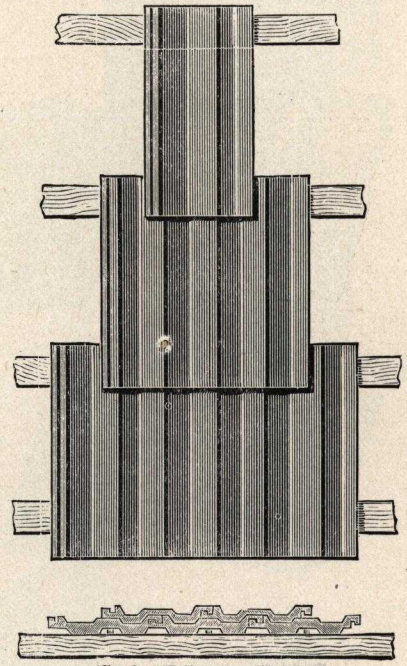
Style "A"—16½"x9½".



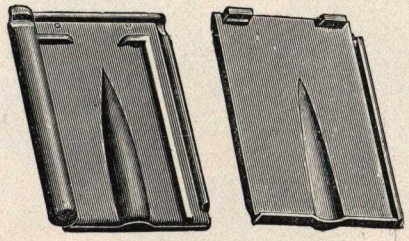
Style "B"—10¾"x8⅝".



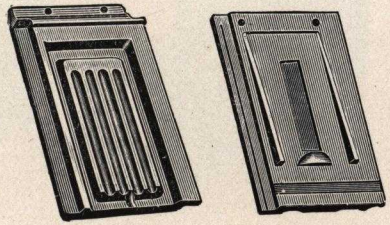
Style "C"—12¼"x8½".



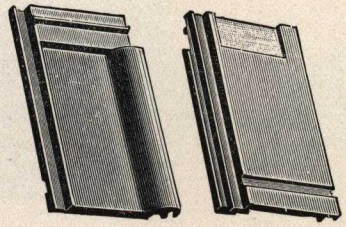
Style "D"—16½"x9½"



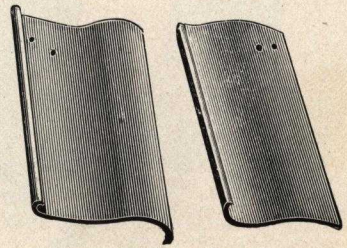
Style "E"—10¾"x8⅝".



Style "F"—9¾"x7".



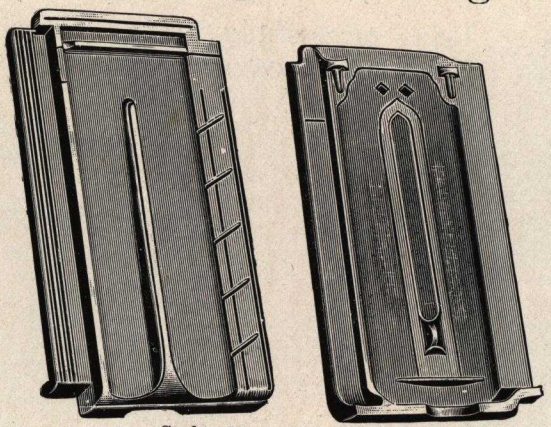
Style "G"—9¾"x7".



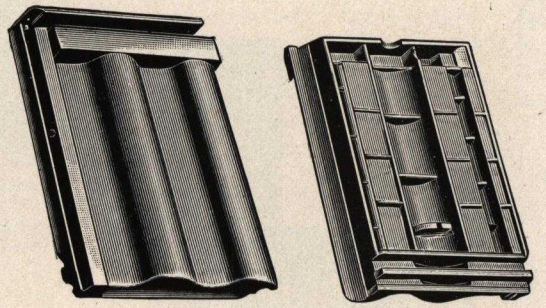
Style "H"—12"x8½".

Roofing Tile Designs.

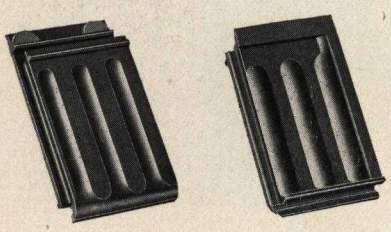
Style "I"—12¼"x8¼".



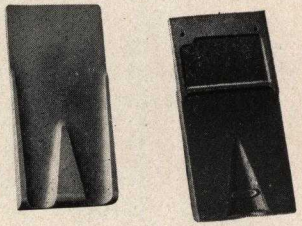
Style "J"—16½"x9½".



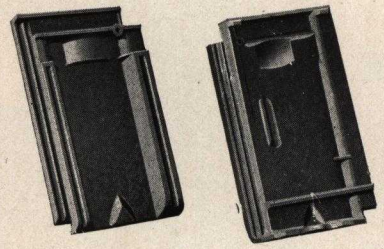
Style "K"—13½"x11"



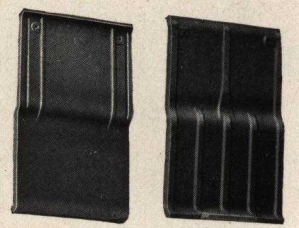
Style "L"—13" x8".



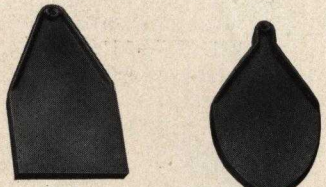
Style "R"—13¾"x6⅞".



Style "S"—14¾"x9¼".

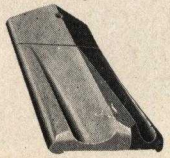


Style "T"—13½"x8".

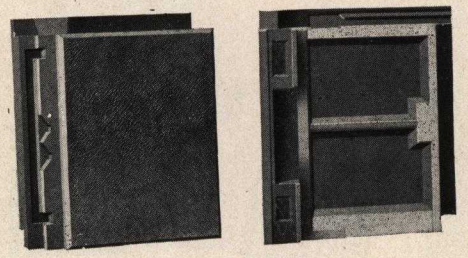


Style "V"—13x7¾.

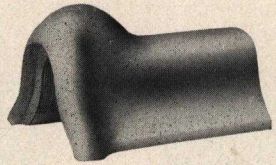
Style "W"—13½x7⅞



Roll No. 1—14x6¾x3

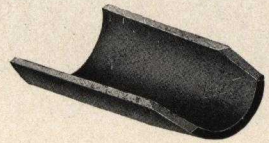


Siding.



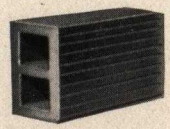
Roll No. 4—13x8x9

Roll No. 3—11¾x8½x6¾

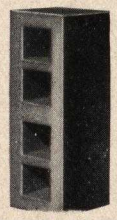


Valley—15¾x7¾x4

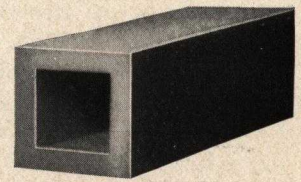
Hollow Block and Brick.



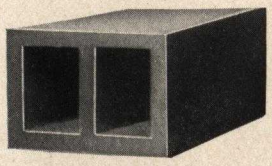
HAVERSTRAW



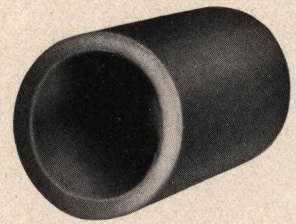
HAVERSTRAW HEADER



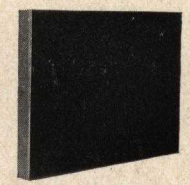
SQUARE HOLLOW BLOCK



OBLONG HOLLOW BLOCK

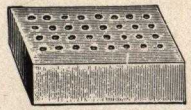


DRAINAGE TILE



ROOFING TILE BLANK

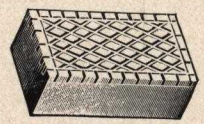
Side Walk Paving Brick.



No. 1. 8¼x8¼

No. 2. 8¼x8¼

No. 3. 10x5



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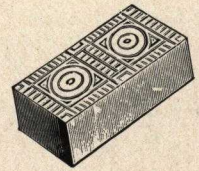

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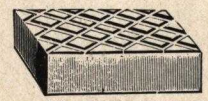

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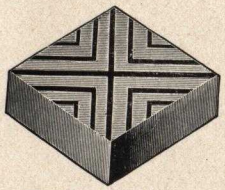

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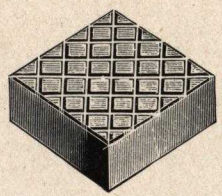

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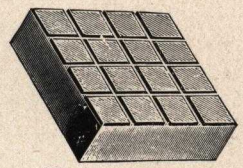
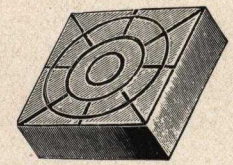
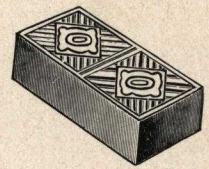


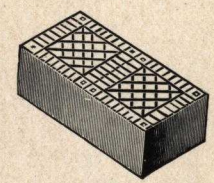
No. 9. 8¼x8¼



No. 11. 8¼x8¼



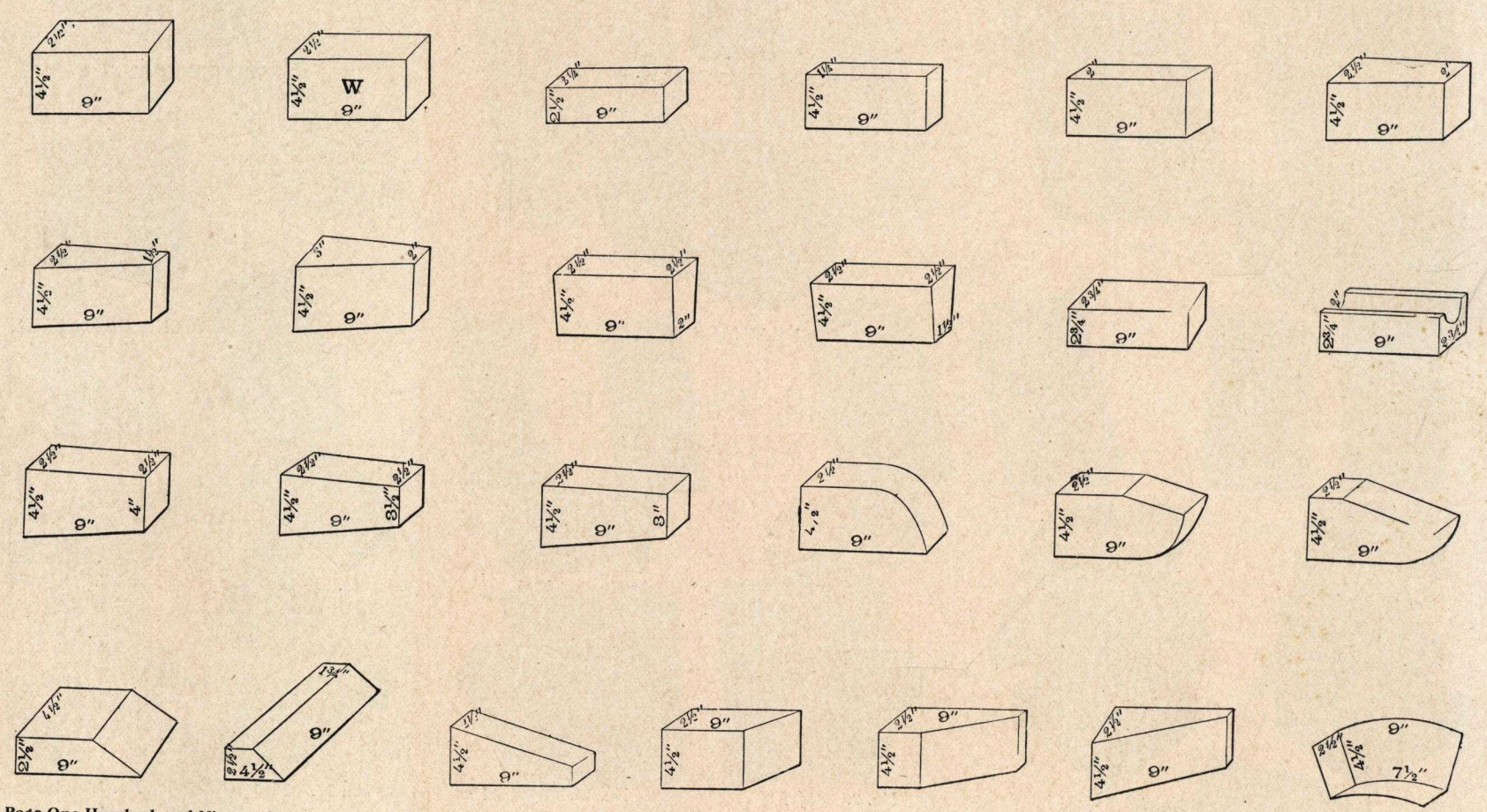
No. 17. 10x5



No. 18. 10x5

Fire Brick.

These shapes are standard fire brick construction and can be made either on our stiff mud machinery and repressed or on the Hercules or Ideal soft mud machines.



Combination Panel Piece 230-231-232. Class B.

Ornamental Brick.

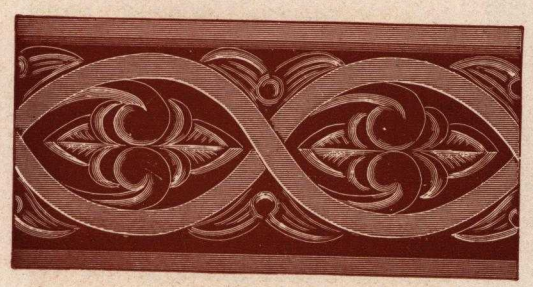
THE great popularity of ornamental brick trimmings as well as of various kinds to meet numerous special conditions as specified by the architect, has lead us to illustrate a number of forms which we find in the most common use. These are all repressed on a Victor Repress or on any other of our line of hand machines. The designs stand out and are very effective in their use. Special designs and plates can be made from drawings and where the designs are of the same size, an unlimited number can be worked on one die with only the necessary expense of an upper plunger and plate with the configuration thereon.

The standard size of repressed and common brick as adopted by the National Brick Manufacturers Association in 1893, reaffirmed in 1899, is as follows:

Common Brick, 8¼″x4″x2¼″
Paving Brick 8½″x4″x2½″
Pressed Brick, 8⅜″x4″x2⅜″
Roman Brick 12″x4″x1½″
Norman Brick 12″x4″x2⅜″

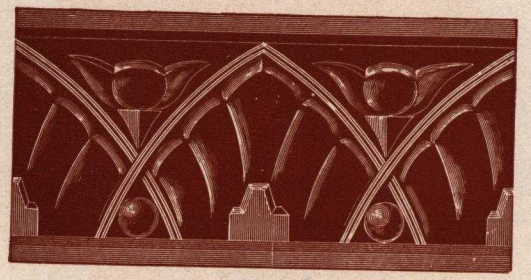
Class "A"

Embraces, Mouldings, Panels, Center Pieces, and special forms in decorated work made from any design submitted. The pieces shown work with three courses of common brick. Will be made to order in other sizes when so desired.

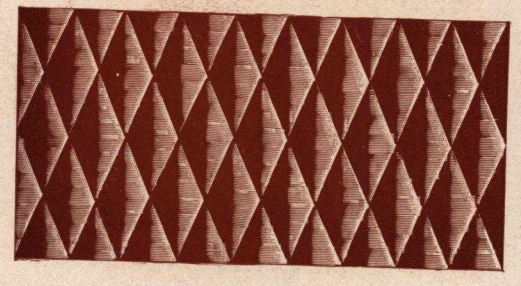


No. 125

No. 126



No. 127



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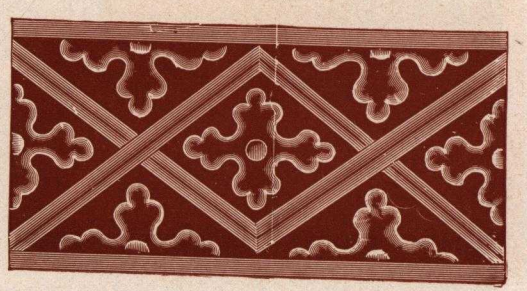
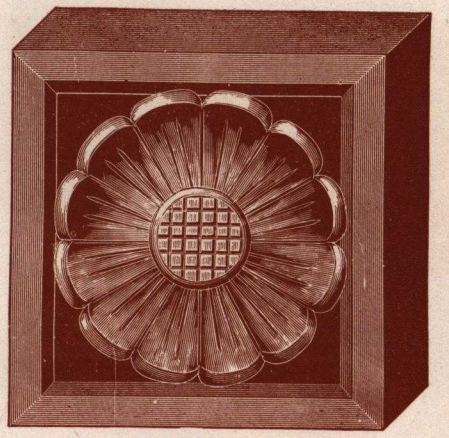


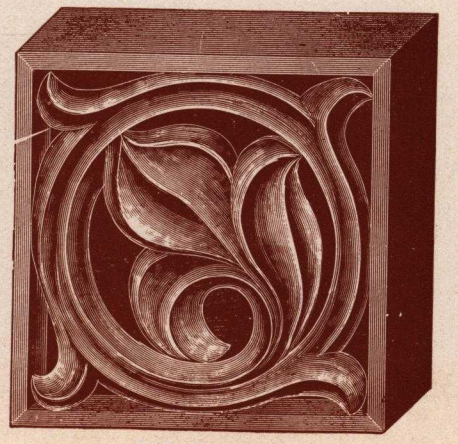
No. 129

Class "B"

Works with four courses of common bricks, 10 by 10 inches, burned. The same designs are made 7 by 7 inches or 5 by 5 inches. Will be made to order in other sizes when so desired.



No. 219



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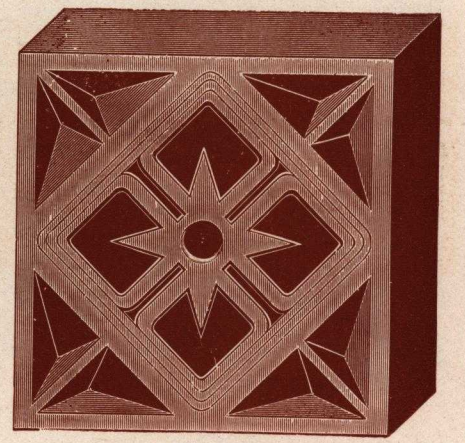

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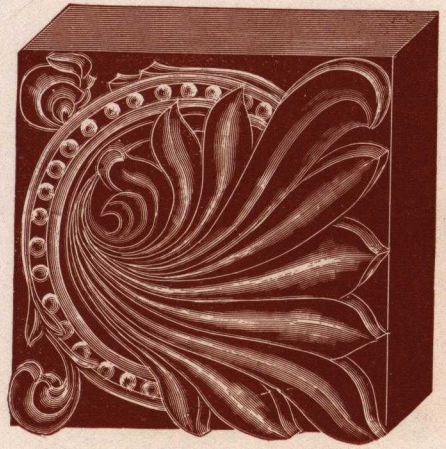
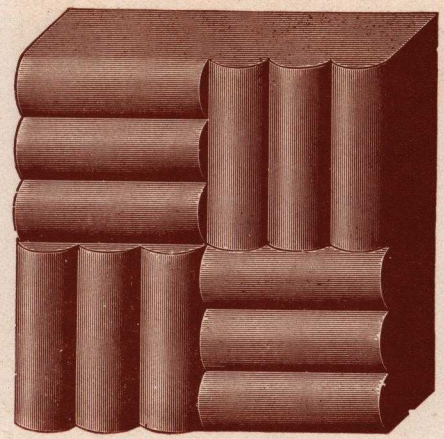
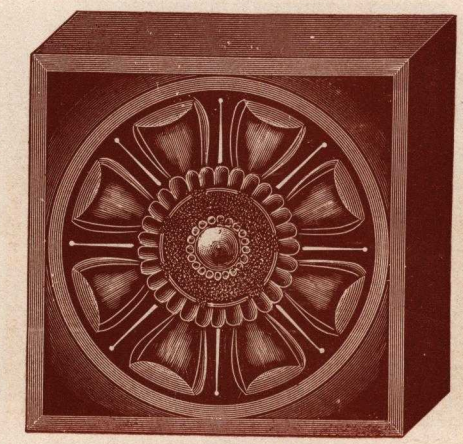


No. 222

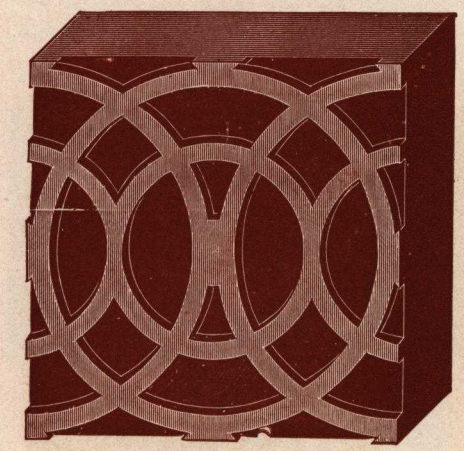


No. 223. Combination of four pieces, made on same die as Class E.

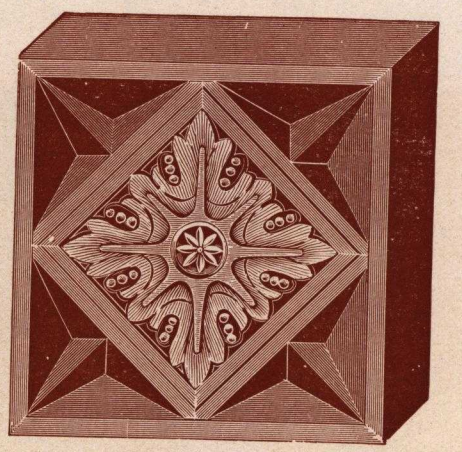


No. 224

Class "B"



No. 225



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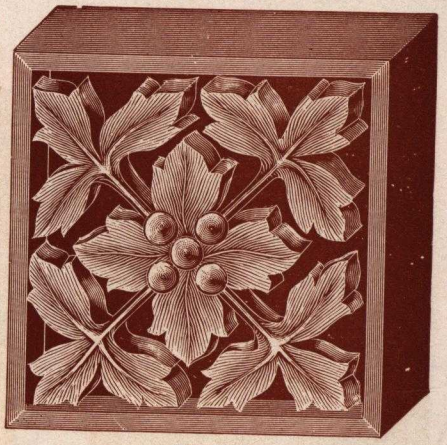

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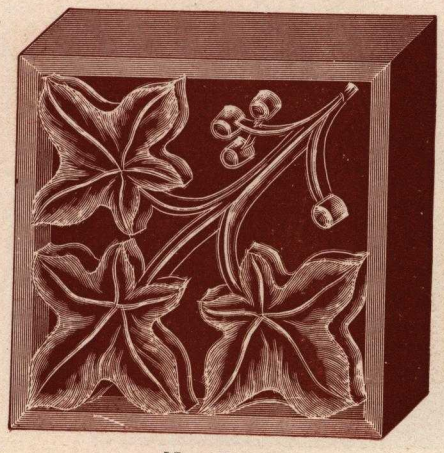

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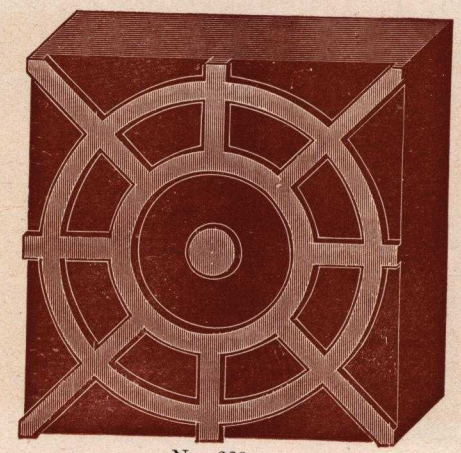
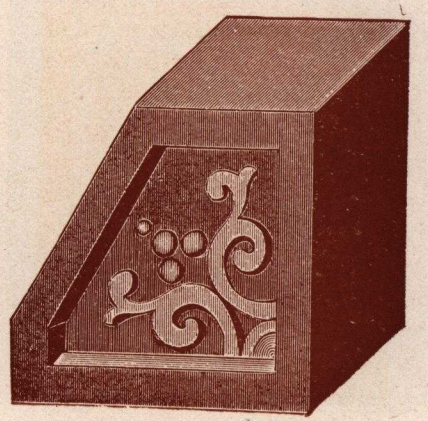


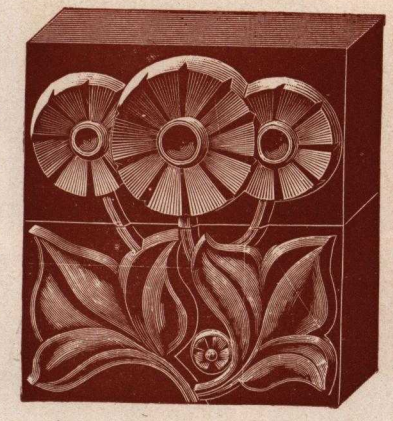
No. 229



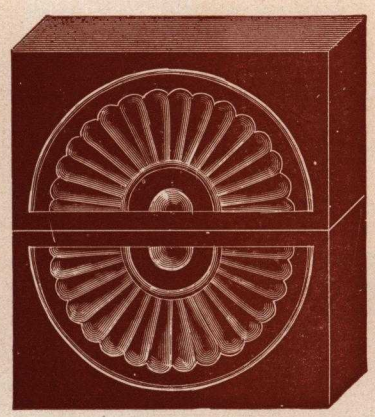
No. 250

Class "C"

Figure complete on two blocks. Works with four courses of common bricks. This design and those of Class "F" may be made upon the same Die.

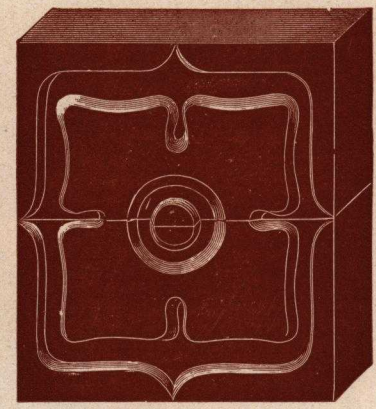


No. 320



No. 321

No. 322



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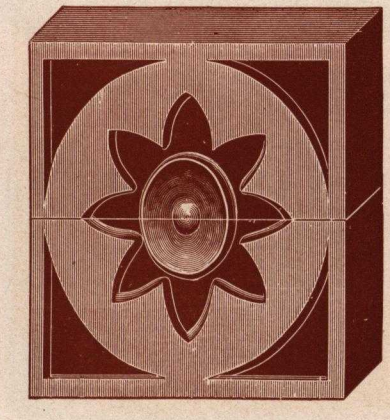

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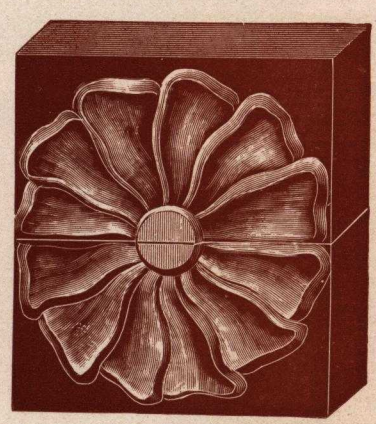

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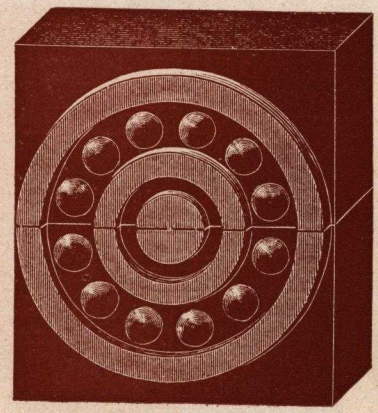
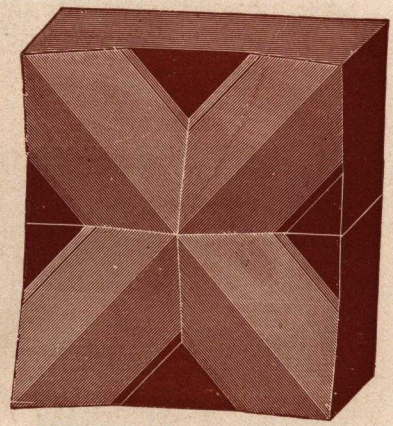


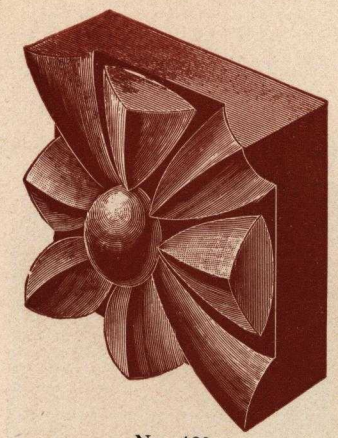
No. 326



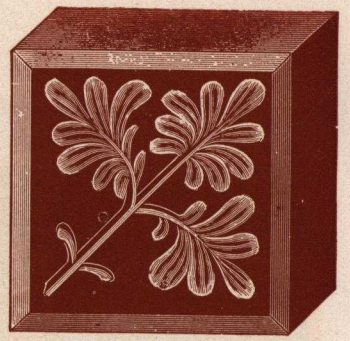
No. 327

Class "D"

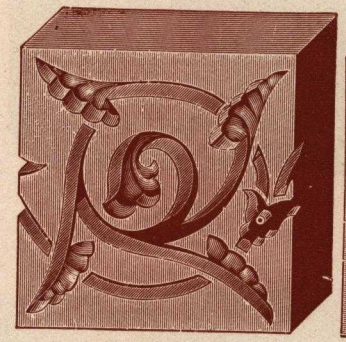
Works with three courses of common bricks, 7½ by 7½ inches, burned. The same designs are made 10 by10 inches or 5 by 5 inches. Will be made to order in other sizes desired.



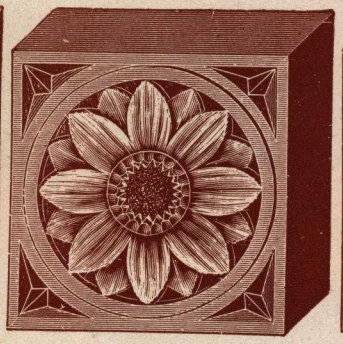
No. 420



No. 421. Diaper for Gable



No. 422



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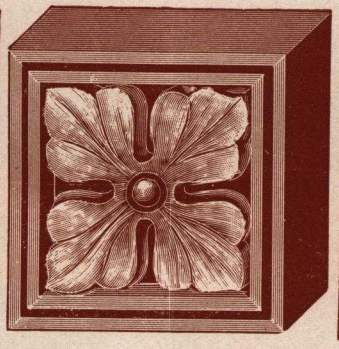
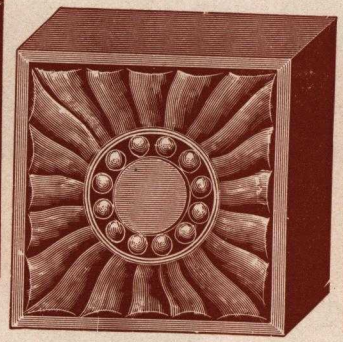
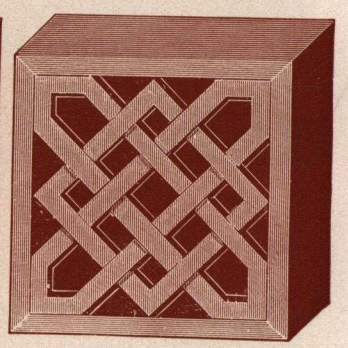


No. 424



No. 425



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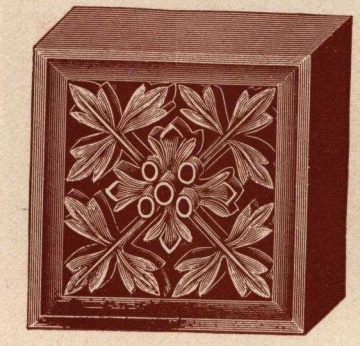
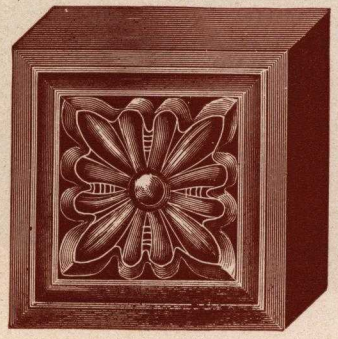


No. 427



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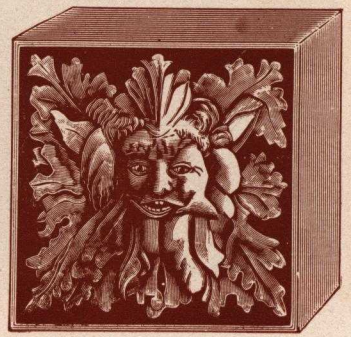
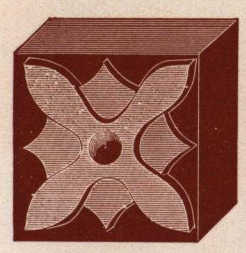


No. 429

No. 430

Class "E"

Works with two courses of common bricks, 5 by 5 inches, burned. The same designs are made 10 by 10 inches or 7½ by 7½ inches. Will be made to order in other sizes desired.



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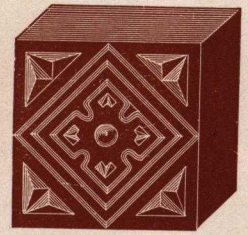

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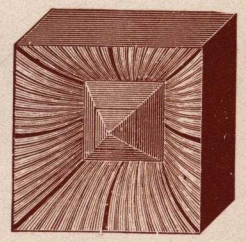

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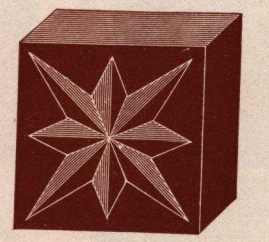

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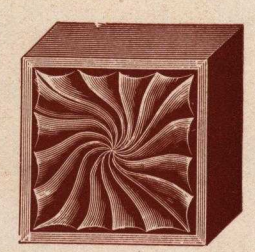
No. 544



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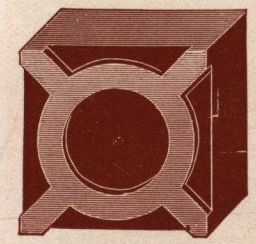

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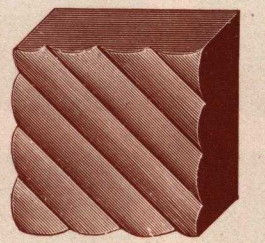

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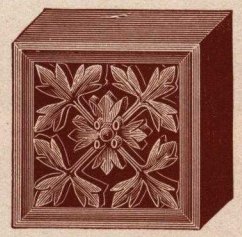

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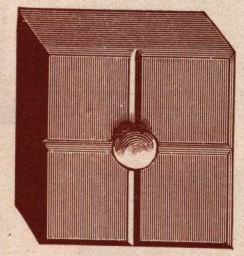

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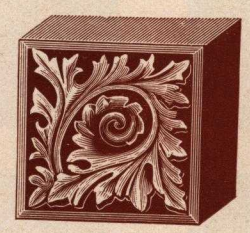

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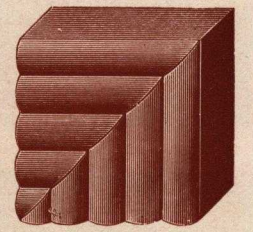
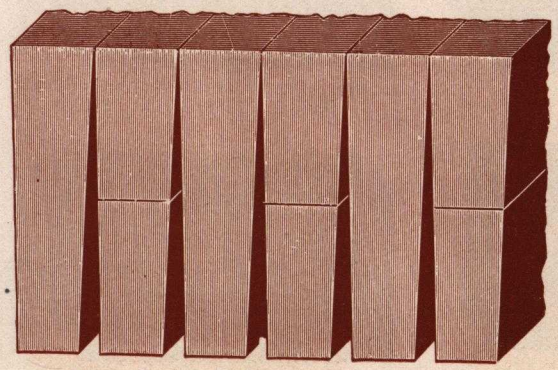
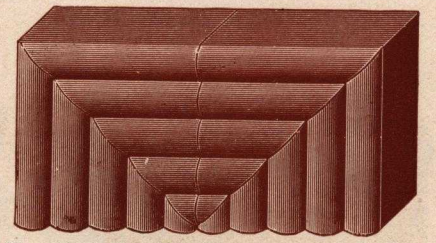


No. 575.
Shown in Combination No. 580



No. 1005

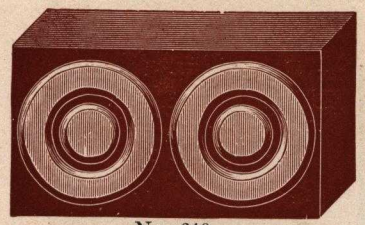
Side and end arch any radius, made upon standard die by change of plungers only.



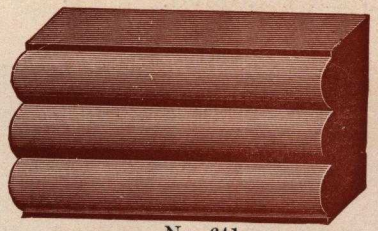
No. 580. Combinatiom of two or four pieces made upon same die as Class "E", shown singly, No. 575.

Class "F"

Works with two courses of common bricks, 8¼ by 5 inches, burned. Can be made on the same Die as Class "C".

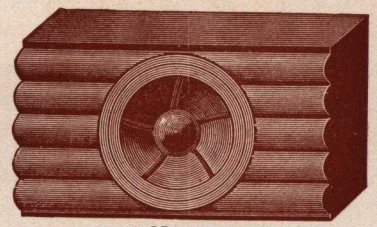


No. 640

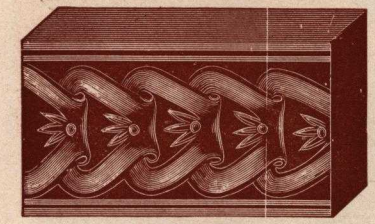


No. 641

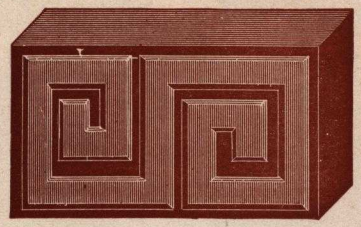
No. 642



No. 643



No. 644



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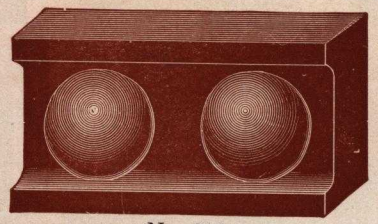
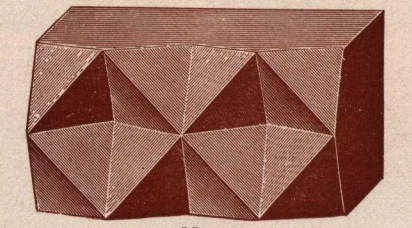
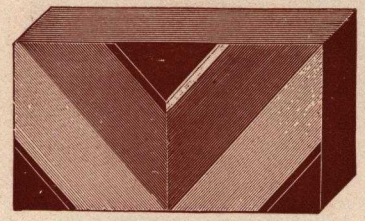


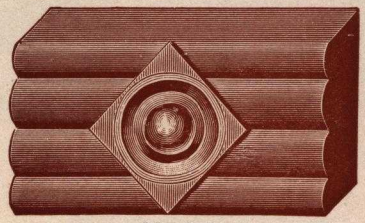
No. 646



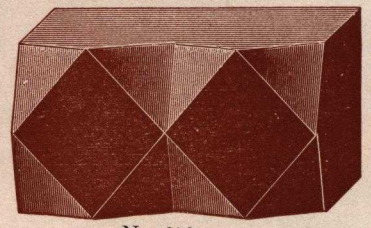
No. 647



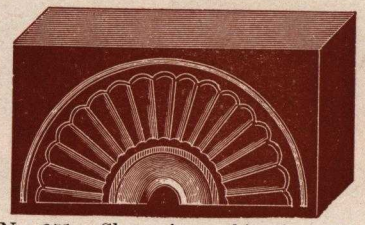
No. 648. Shown in combination of two blocks, Class "C", No. 327



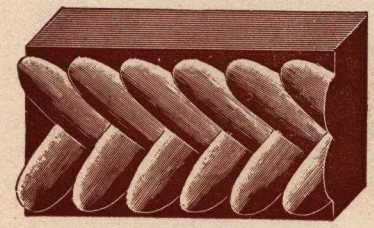
No. 649



No. 650



No. 651. Shown in combination of two blocks, Class "C", No. 321



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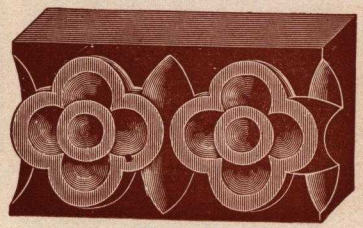

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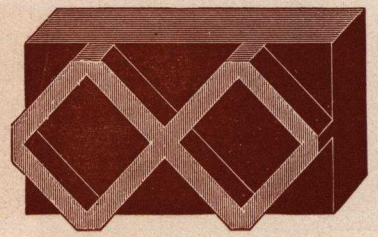

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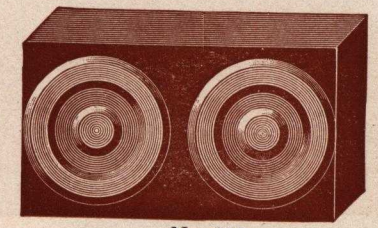
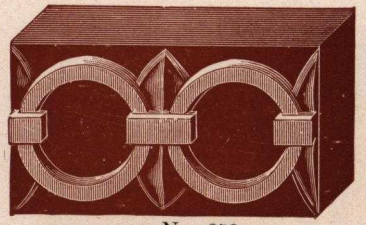
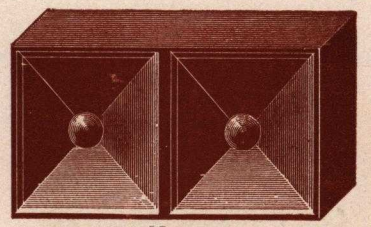


No. 655

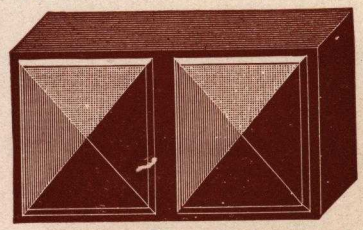
Class "F"



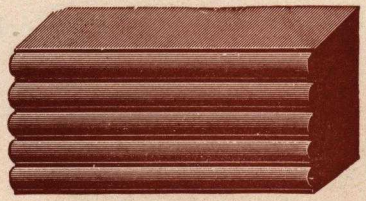
No. 656



No. 657



No. 658



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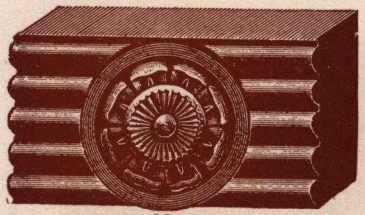
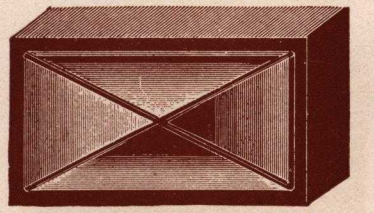


No. 660



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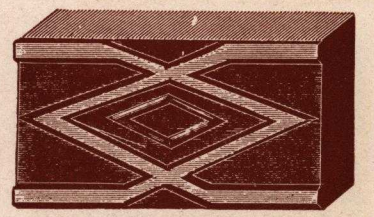

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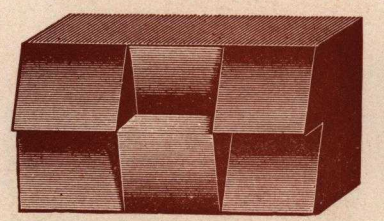

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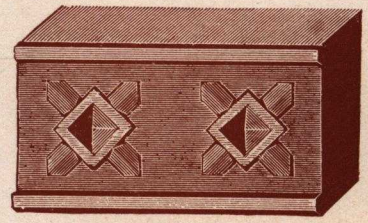
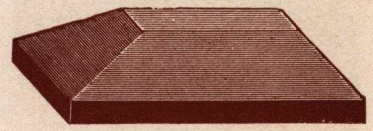
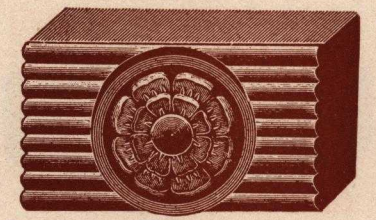


No. 664

No. 665

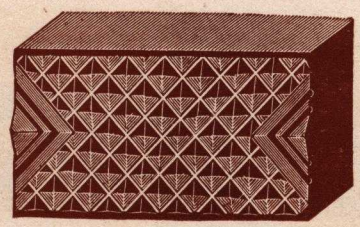


No. 666



No. 667

No. 668



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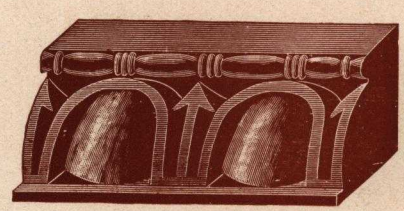
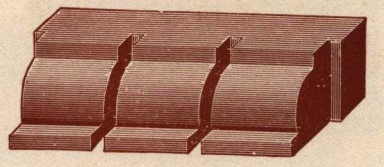


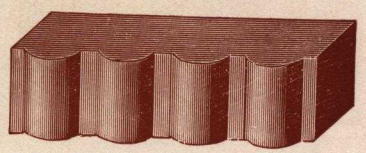
No. 1006. With right and left return.

Class "G"

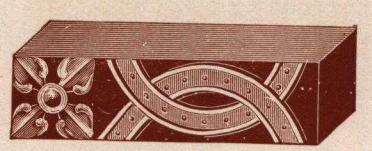
Works with one course of common bricks. Made upon an Edge Die.



No. 749



No. 750



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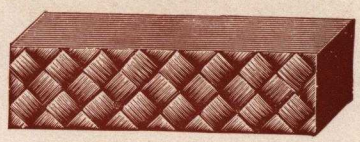

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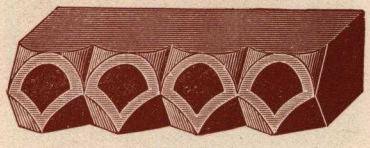

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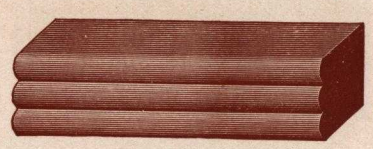
No. 754



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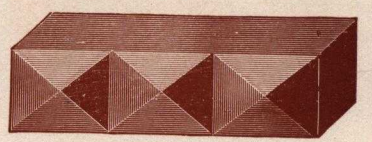
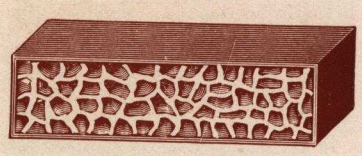
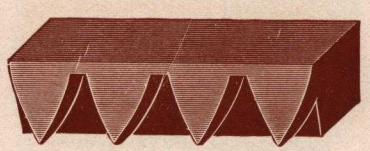


No. 756

No. 757



No. 758



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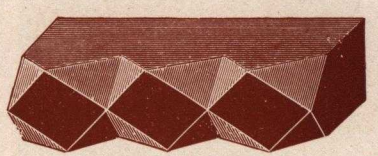
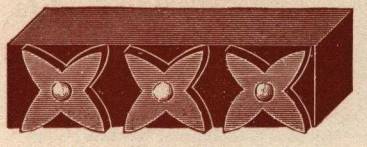


No. 760



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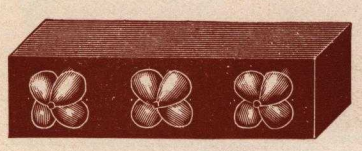
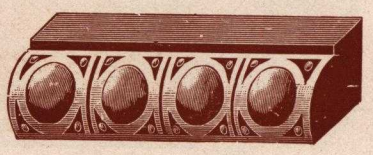


No. 762



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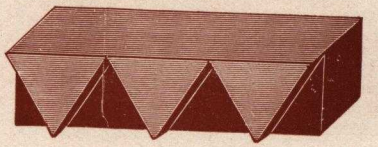
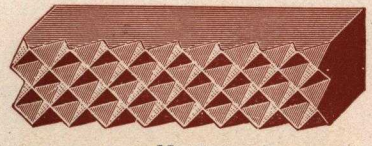
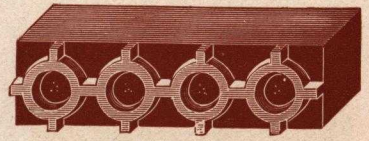


No. 764

Class "G"



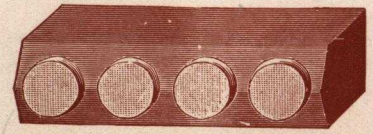
No. 765



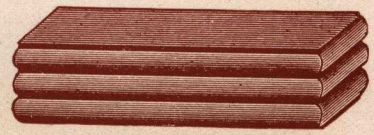
No. 766

No. 767

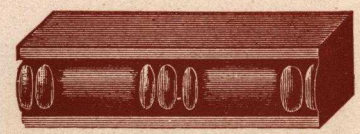
No. 768



No. 769



No. 770. Return for No. 755.



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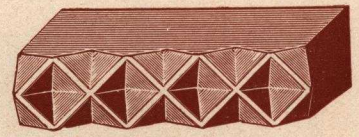
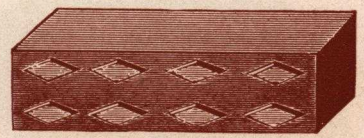


No. 772

No. 773



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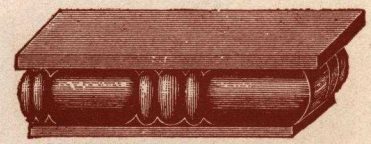

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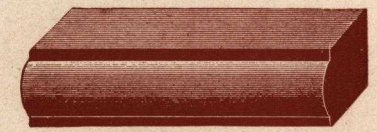

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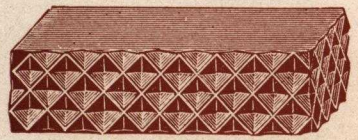
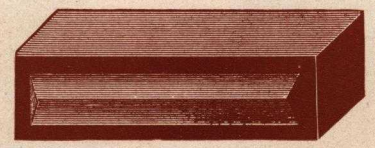


No. 777. Return for No. 765



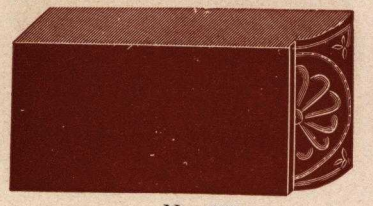
No. 778

No. 779. Return for No. 767

Class "H"

MOLDED BRICK—Molded Bricks are made upon Dies corresponding to the shape of the bricks, or by the use of removable blocks or liners worked in a regular Square Press Die. Starters and Stops, Stretchers and Headers, Right and Left Returns made when ordered.
We also make all size Dies, Ornamental Plates, Liners, or Blocks for special shape bricks from drawings submitted.

No. 827



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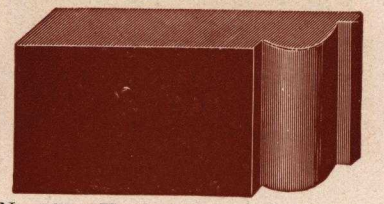
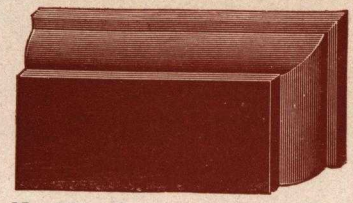
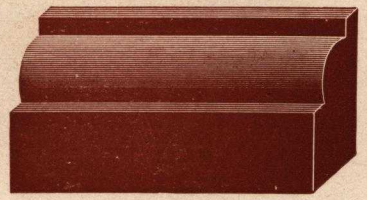


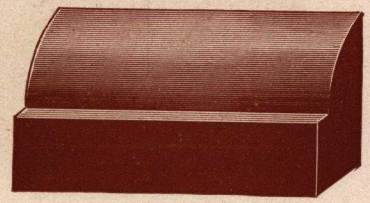
No. 829. Header, works with No. 831



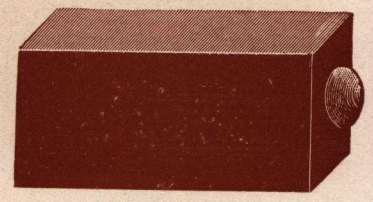
No. 830. Return works with No. 831



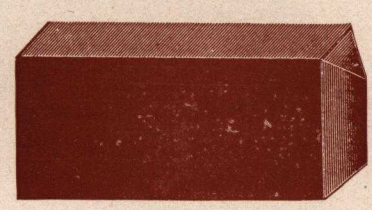
No. 831. Stretcher



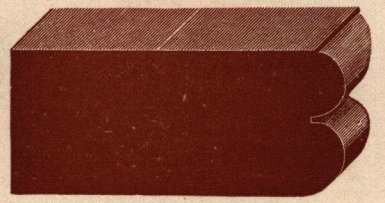
No. 832



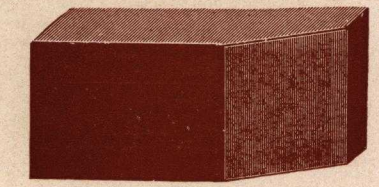
No. 833



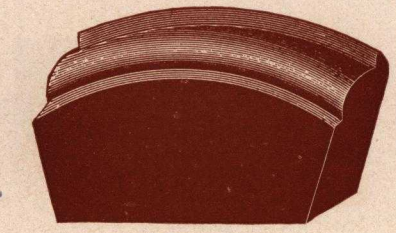
No. 834



No. 835



No. 836



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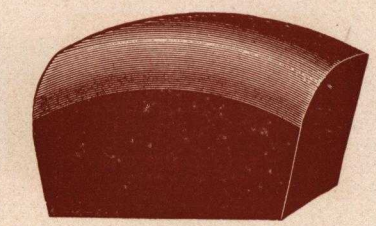
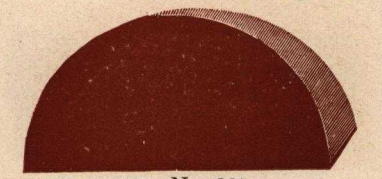
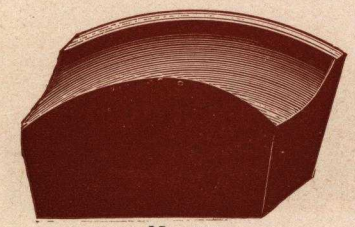


No. 838

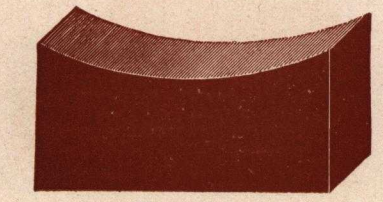


No. 839



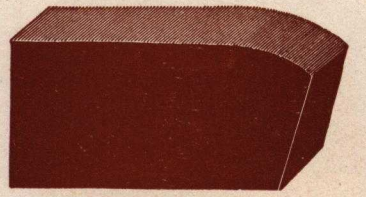
No. 840

No. 841

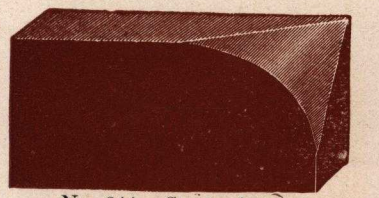


No. 842

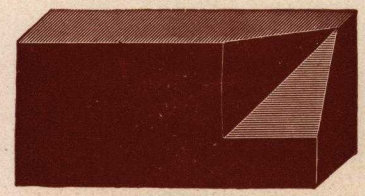
Class "H"



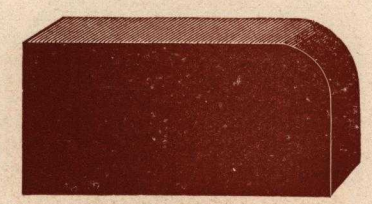
No. 843



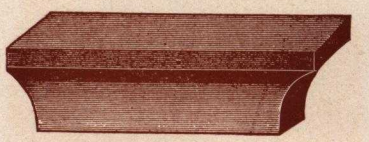
No. 844. Starter for 859



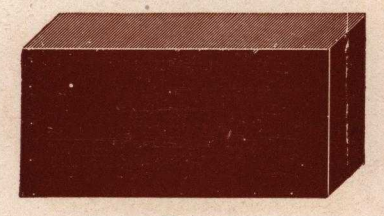
No. 845



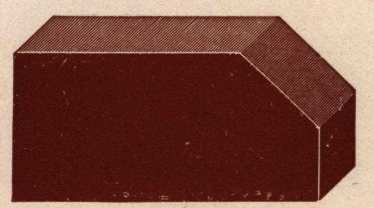
No. 846



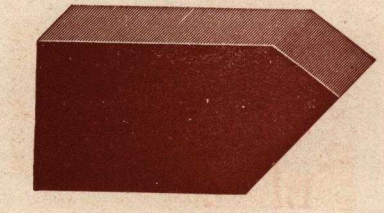
No. 847



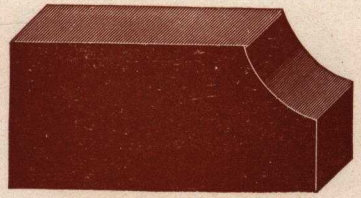
No. 850



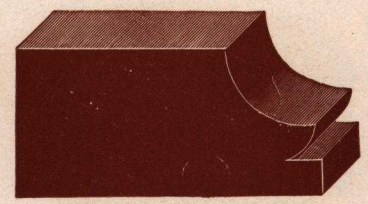
No. 851



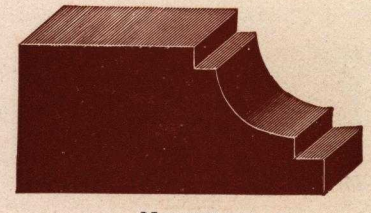
No. 852



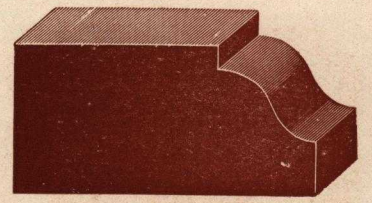
No. 853



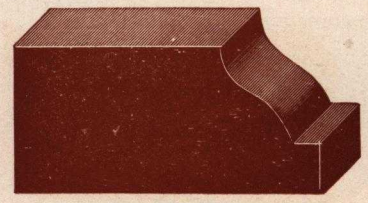
No. 854



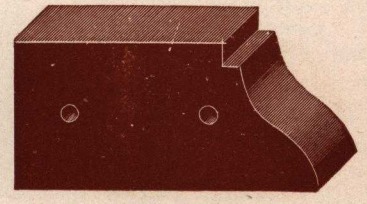
No. 855



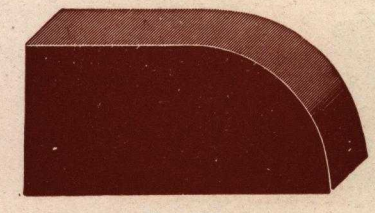
No. 856



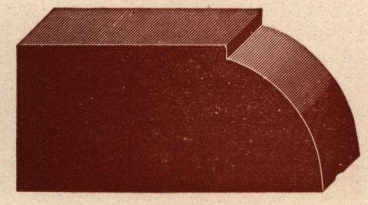
No. 857



No. 858

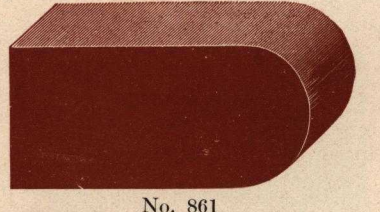


No. 859

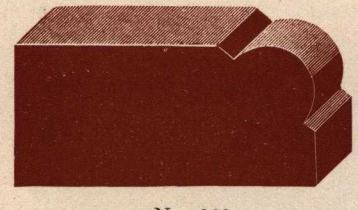


No. 860

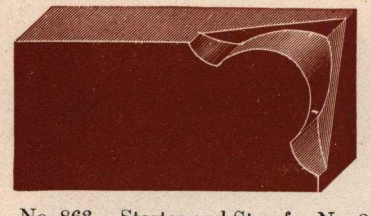
Class "H"



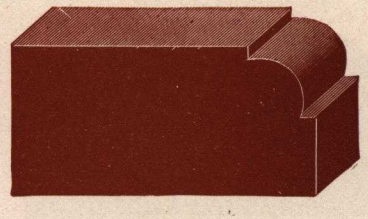
No. 861



No. 862



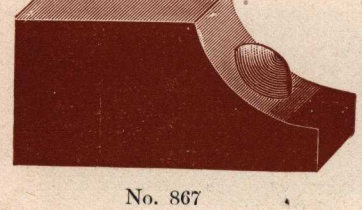
No. 863. Starter and Stop for No. 862



No. 864

No. 865

No. 866



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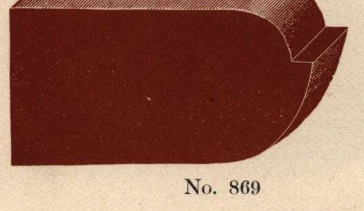

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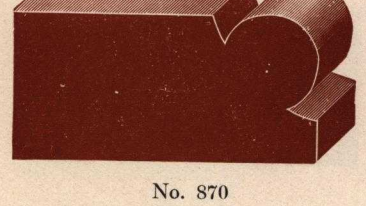

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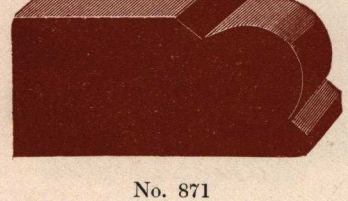

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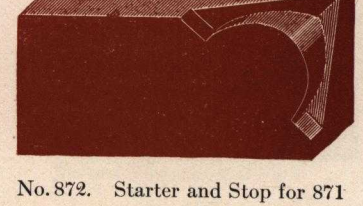

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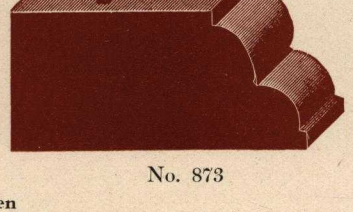

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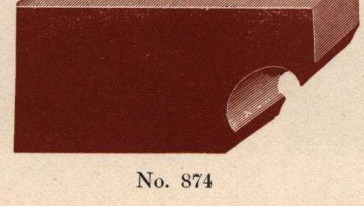

No. 874

INDEX

BRICK MACHINES — Page
- Brick Machine Dies ... 10
- Stiff Plastic Brick Machines ... 11–13
- "999" Special Brick Machine ... 14–15
- "999" Brick Machine ... 16–17
- "888" Brick Machine ... 18–19
- "777" Brick Machine ... 20–21
- "555" Brick Machine ... 22
- Daytonian No. 2 Brick Machine ... 23
- Daytonian No. 3 Brick Machine ... 24
- Combination Brick Machine ... 25
- Combination Special Brick Machine ... 26–27
- Combination No. 1 Brick Machine ... 27
- Combination No. 2 Brick Machine ... 28–29

CRUSHERS
- Disintegrators and Crushers ... 93
- Four Roll Crusher ... 96–97
- Peerless Crusher ... 98
- Conical Roll Crusher ... 99
- Equal Roll Crusher ... 100–101
- Rock Crusher ... 102

CUTTING TABLES
- Automatic Cutting Tables ... 37–39
- No. 1 Automatic Cutting Table ... 40–41
- No. 2 Automatic Cutting Table ... 42–43
- Champion Face Brick Cutter ... 44
- Universal Cutting Table ... 45
- Hand Rotary Cutting Table ... 46
- Triumph Side Cutting Table ... 47
- Novelty Board Delivery Cutting Table ... 48
- Down Cut Board Delivery Cutting Table ... 49
- Rotary Holloware Cutter ... 50
- Automatic Tile Cutting Table ... 51
- Combination Cutting Table ... 52
- Resistance Table ... 52
- Holloware Trimmer ... 52
- Automatic End Cutter ... 53–58

DESIGNS
- Roofing Tile ... 193–194
- Hollow Brick and Block ... 195
- Sidewalk Paving Brick ... 195
- Fire Brick ... 196
- Ornamental Brick ... 197–210

DISINTEGRATORS
- Disintegrators and Crushers ... 93
- No. 10 Special Disintegrator ... 94
- No. 10 Disintegrator ... 95
- No. 20 Disintegrator ... 95
- Combination Disintegrator and Crusher ... 96–97

DRYERS
- The Drying of Clay Products ... 147
- Radiated Heat Dryer ... 148–149
- Metallic Radiation Dryer ... 150–151
- Waste Heat Dryer ... 152–153
- Open Air Dryer ... 154

DRYER CARS — Page
- Dryer Cars ... 155–163
- Transfer Cars ... 164

DRY PANS
- Dry Pans ... 77
- Nine Foot Heavy Duty Dry Pan ... 78–79
- Nine Foot Low Frame Dry Pan ... 80–81
- Nine Foot Standard Dry Pan ... 82–83
- Eight Foot Dry Pan ... 84–85
- Seven Foot Dry Pan ... 84–85
- Five Foot Dry Pan ... 84–85
- Five Foot Grog Pan ... 86

DRY PRESS MACHINERY
- Dry Press Machinery ... 103
- Four Mold Dry Press ... 104–105
- Two Mold Dry Press ... 106
- Hand Dry Press ... 107
- Steam Jacketed Pulverizer ... 108
- Clay Mixer and Steamer ... 108

HOLLOWARE MACHINERY
- Fire Proofing Designs ... 30
- Holloware Machinery ... 31
- Niagara Holloware Machine ... 32–33
- National Holloware Machine ... 34
- Northern Holloware Machine ... 35
- Nonpareil Holloware Machine ... 36

INTRODUCTORY
- Factories of the C. W. Raymond Co. ... 4
- About Ourselves ... 5
- Offices of The C. W. Raymond Co. ... 6
- Proclamation ... 7
- Patents ... 8
- Guarantee ... 8
- Clay Testing and Analyses ... 9

KILNS
- The Burning of Clay Wares ... 165
- The Continuous Kiln ... 166–186
- Continuous Compartment Kiln ... 169–178
- Continuous Tunnel Kiln ... 179–182
- Producers ... 184
- Kiln Fans ... 185
- Periodical Kilns ... 187
- Rectangular Down Draft Kilns ... 188–189
- Round Down Draft Kilns ... 190–191
- Kiln Castings ... 192

POWER PLANT EQUIPMENT
- Engines ... 143
- Boilers ... 144
- Electric Motors ... 145
- Transmission ... 146

PUG MILLS
- Pug Mills ... 59
- Box Frame Pug Mills ... 60
- Heavy Duty Pug Mills ... 61
- Standard Pug Mills ... 62

Page
- Single Geared Pug Mills ... 63
- Bevel Geared Pug Mills ... 64
- Combined Pug Mill and Disintegrator ... 64

REPRESSES
- Represses ... 65
- Victor Repress ... 66–67
- No. 1 Perfection Hand Repress ... 68–69
- No. 2 Perfection Hand Repress ... 68–69
- No. 3 Perfection Hand Repress ... 68–69
- No. 3 Ornamental Hand Repress ... 70
- No. 3 Special Block Repress ... 71
- Eureka Hand Repress ... 72
- Repress Dies ... 72

ROOFING TILE MACHINERY
- The Manufacture of Roofing Tile ... 73
- Roofing Tile Press ... 74–75
- Hand Roofing Tile Press ... 76

SOFT MUD MACHINERY
- Soft Mud Machinery ... 109
- Hercules Soft Mud Brick Machines 111–113–115
- Hercules No. 4 Soft Mud Machine ... 110
- Hercules Special Soft Mud Machine ... 112
- Hercules Senior Soft Mud Machine ... 114
- Ideal Steam Power Brick Machine ... 116
- Ideal Horse Power Brick Machine ... 117
- Standard Brick Machine ... 118–119
- Mold Sanders ... 120–121
- Revolving Dump Table ... 121
- Tempering Wheel ... 122
- Brick Molds ... 123
- Strike Knife ... 123

SUPPLIES
- Sand Crusher and Sifter ... 124
- Sand Dryer ... 124
- Piano Wire Screens ... 125–126
- Revolving Screen ... 127
- Belt Clay Conveyor ... 128
- Elevators ... 129
- Gear and Friction Hoists ... 130
- Winding Drum ... 131
- Automatic Clay Feeder ... 132
- Chain Hoists ... 133
- Barrows and Trucks ... 134–137
- Dumping Cars ... 138–140
- Turn Tables ... 141
- Trackage and Yard Equipment ... 142

WET PANS
- Wet Pans ... 87
- Duplex Wet Pans ... 88–89
- Nine Foot Wet Pan ... 90–91
- Eight Foot Wet Pan ... 91
- Seven Foot Wet Pan ... 91
- Five Foot Wet Pan ... 91
- Automatic Wet Pan Emptier ... 92

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